We are delighted to introduce a new issue of the Journal of Teacher Education for Sustainability (JTES). This volume contains the articles of authors from Latvia, Lithuania, Iran, Colombia, Finland, Namibia, and Indonesia.

The present issue of the JTES preserves a long-established tradition, i.e., authors of articles represent different regions of the world, and thus the JTES maintains the global affiliation for Education for Sustainable Development (ESD), which has originally been intended as a specific goal and content of the journal. Since the launch of the Global Action Programme (GAP) in 2015, sustainability, education for sustainability and education for sustainable development have been increasingly manifested in the journal and it demonstrates the need of all education-related studies to maintain the context of sustainability and the idea of seeking a more holistic perspective in educational research. At the same time, it has become apparent that traditional “piecemeal” approach studies challenge researchers to focus on examining the reasons of unsustainability, which have been accumulated in education and educational research, and which determine and maintain the quality of educational unsustainability. We would like to express our gratitude to all the JTES authors who have joined the search for a mission of the journal and promoted educational research for identifying an ESD mission through their involvement in the development of the field.

We express our heartfelt appreciation to all authors for being able to jointly find some wisdom, which is necessary for recognizing the phenomenon of sustainability and which, in each case of educational studies, helps find the diversity that is in real relations and is essential for the elaboration of ideas of contemporary educational research for ESD.

The paper by Inese Jurgena, Dagnija Čedere, Ingrida Keviša reflects on the correlation between learners’ cognitive interest, personal participation and the pedagogical approaches chosen by teachers. The data were obtained in the survey of 9th form students in 17 Latvian schools (536 respondents) conducted in 2015–2017. The results of the study show that students’ opinions concerning their personal participation in the process of learning are contradictory; however, there is a connection between learners’ cognitive interest, personal participation, and the approach chosen by a teacher. Using the trans-disciplinary approach, the students would form the notion of the material world based on interconnected knowledge as the foundation for future scientific cognition.

The paper by Somayyeh Ghorbani, Seyed Ebrahim Mirshah Jafari, Fereydoon Sharifian discusses the teachers’ professional competences in “learning to be” and provides practical solutions for its realization. The research employed a mixed-methods sequential explanatory design and was conducted through two qualitative and quantitative methods. It was discovered that from the teachers’ viewpoints, the most important competences “in learning to be” were their ability to develop self-esteem and self-confidence in students, ability to increase personal skills such as self-awareness and self-belief in students, and their ability to guide students to determine the valuable goals for their lives. There was a consensus among views of experts and teachers about professional competences. There were no differences in the teachers’ opinions regarding the demographic characteristics of professional competences. Practical solutions of this learning approach were categorized by educational experts into solutions related to teachers’ educational strategies, educational-training modalities, and the involvement of effective factors.
The paper by Walter Alfredo Salas-Zapata, Leonardo Alberto Ríos-Osorio, Jaiberth Antonio Cardona-Arias emphasises that the transition towards sustainability requires profound and radical changes in beliefs, values, and patterns of social behaviour. In this regard, the studies related to knowledge, attitudes and/or practices (KAP) are important because they provide a basis for exploring the potential sources of success or failure of initiatives that promote sustainability. As references to KAP studies on sustainability are scarce, a systematic review was carried out to analyse KAP studies on this topic. This kind of synthesis would be a useful tool to support projects aiming at promoting changes in human behaviour. This review found that, even though many studies involved university students, the set of knowledge, attitudes and practices were heterogeneous.

The paper by Eveline O. Anyolo, Sirpa Kärkkäinen, Tuula Keinonen discusses Namibian school teachers’ perceptions of Education for Sustainable Development (ESD) and the teachers’ teaching practices. The findings revealed that senior secondary school teachers perceived ESD in terms of knowledge acquisition about the environment and the sustainability use of its resources for the benefit of future generations. The study also revealed that ESD was integrated into the senior secondary school curriculum; within the existing subjects, a policy framework established the relationship between subjects and suggested a multi-disciplinary approach to ESD and, as an independent subject, a policy framework suggested an inter-disciplinary approach to ESD.

The paper by Rita Vaicekauskaite, Asta Valackiene focuses on entrepreneurship that signifies a new type of economy; therefore, it is necessary to consider the need for a new type of education. The growing number of studies confirms that education plays a significant role in fostering entrepreneurship. Recent measurements have mainly been oriented to education as fostering motivation for business-oriented entrepreneurship; moreover, growing attention is devoted to sustainability entrepreneurship as well. However, we do not have a clear answer if the same models of education could be equally effective for both business-oriented and sustainability entreprenurships. Our study implies that it is not difficult to start an entrepreneurial activity without a special educational programme; however, it is difficult to develop it and finalize successfully. Educational programmes are a valuable prerequisite for entrepreneurship when they are based on integration of complex factors encompassing theoretical knowledge, competence development, and confidence fostering.

The paper by Bahareh Khazaeenezhad, Mansoor Tavakoli, Zahra Amirian reflects on a professional development in sustainable teacher education that has shifted its focus on pedagogical practice over theoretical knowledge. Given that reflection practice could have an effective role in identifying undiscovered potentials of prospective language teachers, the current study was an attempt to examine the core qualities of prospective language teachers in a way to sustain professional development. To that end, a core reflection model was practiced by prospective teachers and the obtained data revealed several core qualities according to the three scales of feeling, thinking, and willing, which appeared to have been developed through interaction of both theoretical knowledge and pedagogical practice.

The paper by Sumaryanta, Djemari Mardapi, Sugiman, Tutut Herawan discusses the issue of teacher assessment that has recently been considered as a minor issue in education. The authors assert that there is a lack of teacher’s competency assessment for the sustainability of teacher’s profession development. This study describes the model of teacher’s assessment, which has been implemented in Indonesia. The data were collected through teacher’s competency test, which was undertaken by more than 4.5 million
teachers in the period of 2012–2016. The obtained data were analysed using descriptive quantitative and qualitative methods. The test results were used to measure the mastery of pedagogic and professional competence of teachers. The results were also used to determine a sustainable training programme of teachers’ quality improvement. They provided the best practice for the implementation of teacher’s competency mapping.

The paper by Laura Dzelzkalēja, Jānis Kapenieks (Sen.) provides a summary about contradictions that are present nowadays in higher education. Despite a lot of research and rapidly developing knowledge and technological possibilities, it seems that higher education is not changing in an appropriate manner. Thus, it is important to understand the underlying reasons and historical background of this situation to be able to move towards a higher education system for sustainability. Seven main contradiction groups were distinguished, and an overview given in the article. The analysis is more focused on the situation in Latvia and the post-soviet space since the authors are well acquainted with the system. The main future research object is a university mission since from the analysis of a mission statement it was found that low rated universities were lacking the distinction between education and training. The research places a special emphasis on training in mission statements. This highlight a growing problem in future since this situation interferes with the goal of sustainable education.

The paper by Merija Jirgensons, Jānis Kapenieks reflects upon the Blockchain technology that creates an online infrastructure and enables learners to store, manage and control learning credentials. The technology enables users to shape lifelong learning pathways that are personalized and sustainable over the long run by providing online management tools that are permanent, transparent, and reliable. The article “Blockchain and the Future of Digital Learning Credential Assessment and Management” analyses blockchain educational technology experiments in the UK, EU and at MIT in the USA and argues that the technology offers a solution to the maintenance of sustainable learning records that give learners direct control and long run security and are in line with the EU, EQF and UN mandates. Universities also benefit from reduced administrative costs and bureaucratic red-tape.

Last but not least, the paper by Jelena Fedosejeva, Aleksandrs Boče, Marija Romanova, Dzintra Iliško and Oksana Ivanova suggests a more holistic research perspective in education research and proposes strategic use of approaches and methods for sustaining the generational readiness for sustainable development. The paper proposes a general framework for pedagogy and practice for ESD research that is open, holistic, strategic, sustainable, and integrated. A broader perspective has been developed since the relation of the ecological-cultural-social environment aspects is seen in a broader adaptive evolutionary sense as a condition necessary for the development of a human species and the development of these conditions in the evolutionary process. The authors carried out an observational study by involving participants from the two cooperation partners of the Latvian and Lithuanian vocational secondary schools. The evaluation of the participants’ real experience in a wider and broader framework was used to draw strategic conclusions.

We would like to express our gratitude to our guest editors and all the reviewers who assisted in designing this volume. The next volume will include the articles presented at the 16th annual BBCC/JTES international conference “Reorienting Teaching and Learning Strategies for Building Sustainable Future” that will take place on 1–4 November 2018 in Antalya, Turkey.

Team of Editors-in-Chief: Ilga Salite, Javad Gholami, Hussein Meihami, Dzintra Iliško.
The Prospects of Transdisciplinary Approach to Promote Learners’ Cognitive Interest in Natural Science for Sustainable Development

Inese Jurgena and Dagnija Čēdere
University of Latvia, Rīga, Latvia
Ingrīda Keviša
Academy of Culture, Rīga, Latvia

Abstract
The use of transdisciplinary approach to promote learners’ interest in the acquisition of natural science at school provides new opportunities for a complex explanation of the phenomenon and improving the quality of the process of learning. The aim of the study is to explore the learners’ cognitive interest, personal participation and the approaches chosen by teachers from the perspective of transdisciplinary approach. The study characterises students’ subjective evaluations of their personal participation and cognitive interest in the subjects of biology, chemistry, physics and mathematics, and the approaches used by teachers. The participants were 9th grade students from 17 Latvian schools (536 respondents) with the average age of 15.3 (SD=0.63). The results of the study showed that students’ evaluations concerning their personal participation in the process of learning were contradictory. They devote little of their free time to the acquisition of science subjects. As to teachers’ activity, a variety of teaching approaches are used. According to students’ subjective evaluations, the constructivist learning approach corresponds to the trends of sustainable education, whereas the overall context in which the development of learners’ cognitive interest in the acquisition of natural science subjects takes place at school highlights issues concerning the sustainable development of the system and the prospects of using the transdisciplinary approach.

Keywords: cognitive interest, natural science, personal participation, teaching approach, transdisciplinary approach

The General Context of the Study
Interest in the transdisciplinary approach to science and education is related to complex and interrelated issues of real world that need to be not only understood, but also resolved in practice, stepping beyond the borders of one field of science. Science and technology education is closely connected with the development of society; however, many international and national studies reveal the contradiction between the...
increasing societal needs and the insufficient level of young people’s education in this field. Interest is one of the components of intrinsic motivation and one of the reasons why students may enjoy learning. What distinguishes it from other sources of enjoyment is that interest is always directed towards an object, activity, a field of knowledge or a goal (OECD, 2016).

Cognitive interest is a complex psychological phenomenon based on the personality characteristics and mental experience in the form of persistent, self-regulated, positively encouraged desire to increase the focus on a specific learning content (Cedere, Jurgena, & Tarmagadze, 2018). The use of the transdisciplinary approach to solve the burning issues of education and its sustainable development can open new prospects for the understanding and explanation of the complex issue of the development of learners’ cognitive interest.

In the context of global challenges, the study of global issues cannot take place within one field of science and one discipline; the concern about the methodological purity of a certain discipline and protecting its boundaries from the potential influence of other disciplines can lead to the self-isolation of the respective discipline regarding knowledge, cooperation and the spread of ideas (Muravska & Ozoliňa, 2012).

The studies conducted in the past decades predict important transformations in the system of education. These studies indicate that the space of education is changing dramatically, and it needs a new paradigm (Flogie & Abrešek, 2015).

Therefore, the need to turn to the transdisciplinary approach for the sustainable development of education has emerged as a possible solution that can provide a new open perspective for the understanding and interpretation of the complex phenomenon of sustainability. “The need to focus on a transdisciplinary approach in education for sustainable development (ESD) has been reflected in research and especially action research as a possible solution, which can open a new perspective for understanding and interpretation of the complex phenomenon of sustainability as well as for developing new open continuing education programmes by integrating research and learning activities in the context of open transdisciplinary research” (Salite et al., 2016, p. 135).

What sets transdisciplinarity apart from other approaches, and what assures its role in the twenty-first-century education is its acceptance of and its focus on the inherent complexity of reality that is seen when one examines a problem or phenomenon from multiple angles and dimensions with a view toward “discovering hidden connections between different disciplines” (Madni, 2007, p. 3).

The current approach of transdisciplinarity is characterised by three key discourses: transcendence, problem solving, and transgression. According to Klein, the main epistemological idea of the discourse of transcendence is the idea of unity, which is rooted in Ancient Greece in the West. The emerging of transdisciplinarity implies the need for a new synthesis resulting from the increasing fragmentation of knowledge and culture (Klein, 2015).

In Ancient Greece knowledge was not limited to a definite discipline, and the leading scholars could freely engage in various fields of knowledge. Because of reductionism, which began with Aristotle and lasted until the end of the previous millennium, a lot of separate disciplines emerged with strictly set boundaries (Bregant, Stožer, & Cervenik, 2010). Aristotle’s idea of phronesis, which has not been fully understood and used in education, is also important in this respect (Salite, Gedžüne, & Gedžüne, 2009).
The issues resulting from the crisis of sustainability and the global environment brought transdisciplinarity to the foreground again in the 1990s within the context of reforms in higher education (Klein, 2001, 2015). Transdisciplinarity re-emerged in the 1990s as an urgent issue related to the solution of new, highly complex, global concerns, beginning with climate change and sustainability and extending into many areas concerning science, technology, social problems and policy, education and the arts. Transdisciplinarity today is characterized by its focus on complex problems that need creative solutions, its reliance on stakeholder involvement, and engaged, socially responsible science (Bernstein, 2015). This underlying assumption is also used by other scholars when explaining the transdisciplinary approach (Pipere, 2016; Salite, Drelina, Iliško, Oľehnoviča & Žarišča, 2016).

Several scholars suggest that the transdisciplinary approach reflects changes in the way how we think about education challenging the division of academic labour into traditional disciplines.

The advent and development of transdisciplinarity demonstrate emerging ways not only of organising, but also of thinking about knowledge and inquiry in a world that has become “too big to know” (Weinberger, 2011). As Alfonso Montuori (2008) writes in his foreword to a recent book on the subject, transdisciplinarity is perhaps a new way of thinking about and engaging in inquiry.

Scholars suggest that the issues concerning the sustainability of education could be solved using the paradigm of complexity, which requires more complex and comprehensive views, and, consequently, a new vision of the world and a new interpretation of the world (Pipere, 2016). The experience of the activity of BBCC (Baltic and Black Sea Circle Consortium) as the development of a complex system and process also shows how, focusing on evolution in cooperation relationships, it is possible to find answers that enable the reorientation of teacher education to sustainable development (Salite, 2015).

Transdisciplinarity does not have one certain definition encompassing all its diverse manifestations. Therefore, it is important to analyse the ideas of various scholars concerning their understanding of transdisciplinarity.

The word “transdisciplinarity” was introduced in 1970 at a seminar on interdisciplinarity in universities held at the University of Nice. The eminent Swiss psychologist Jean Piaget is generally credited with coining the term (Lopez-Huertas, 2013; Nicolescu, 2010; Padurean & Cheveresan, 2010). The conclusion of Piaget’s (1972) essay on various kinds of interaction between the disciplines mentions transdisciplinarity offhand, as a “higher stage succeeding interdisciplinary relationships ...which would not only cover interactions or reciprocities between specialised research projects but would also place these relationships within a total system without any firm boundaries between disciplines” (Piaget, 1972, p. 138).

Nicolescu gave a more precise definition of transdisciplinarity by pointing out that “transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge” (Nicolescu, 2010, p. 22).

Nicolescu’s contribution to the understanding of transdisciplinarity and philosophy has been highly evaluated by Sue McGregor, who suggests that “Nicolescu concerns himself with the meaning of going beyond disciplines and asserts that, transdisciplinarity...
identifies with a new knowledge about what is between, across, and beyond disciplines” (McGregor, 2015). Indeed, Nicolescu developed a completely new and universal methodology to create new knowledge and solve complex problems.

The scholars belonging to Zurich school highlighted the importance of transdisciplinarity in solving real world problems and the interconnectedness of science, society and technologies in the world today (Tejedor & Segalas, 2013).

Unfortunately, education has focused on the multidisciplinary approach so far, which envisages considerable autonomy for each discipline (Salite et al., 2016). A vivid example is the fact that natural science is divided into the subjects of physics, chemistry and biology in our schools.

Nowadays, it is no longer sufficient that learners acquire knowledge and skills in separate subjects; they also need more experience in using them and the tools for solving problems in their daily lives. There are no separate disciplines in real life; the ability to act and solve problems is based on the integration of knowledge and skills or their merging in a definite life situation with a definite purpose at a definite moment. It means that the new paradigm of education should rise at a higher level. Therefore, it is necessary to consider transdisciplinarity in the process of teaching/learning, which means exploring some real-life problems and integrating the views of several disciplines on it, so that learners could relate their new knowledge and deeper understanding to real-life experience.

In the context of sustainability, the new strategy in science education can be characterised as a “socio-scientific issues-based approach”, which is focused on the development of critical thinking skills and learners’ understanding of the real world based on inventions and innovations in science and technology that affect their lives (Eilks, 2015). Scholars use the transdisciplinary approach to offer complex models for the implementation of education reforms.

In the context of our study, an interesting example is the model of cognitive neuro-education, which blends neuroscience, cognitive science, education and other related sciences to create a new transdisciplinary field, encompassing all the research related to the process of learning, and break the intellectual walls separating these disciplines (Flogie, Dolonec, & Aberšek, 2015).

This model highlights two important premises: first, the process of teaching and learning should start with neuroscience; second, it is important to consider the way how the human brain acquires and processes information. Besides, the possibilities of creating an appropriate learning environment should be considered because the needs of education must always be perceived in a complex way; its content, teaching methods, learning environment, and the organization of the process of education are always intertwined. As we know, the mission of education is to experience what has been learned in a qualitative transition from declarative knowledge to the knowledge of experience, and from knowledge in the broader meaning of this word to useful competencies (Flogie & Aberšek, 2015).

The results of research conducted in several European countries reveal the signs of unsustainability in the process of learning since traditional approaches do not always promote leaners’ interest in the subjects of natural science mainly because they do not see a link between science, real life, their personal interests and participation in the process of learning.

Lack of interest in natural science is an old issue, and it still exists (Cedere, Jurgena, & Targamadze, 2018; Potvin & Hasni, 2014; Sjoberg & Schreiner, 2010). According to
The Prospects of Transdisciplinary Approach to Promote Learners’ Cognitive...

Osborne (2014), natural science education does not always achieve its planned goals because learners lack interest in these subjects. Our previous studies also imply a low level of interest among 9th grade students regarding natural science subjects and mathematics (Cedere, Jurgena, & Gedrovics, 2015; Cedere, Jurgena, & Praulite, 2016). Only one fifth of the Latvian 9th grade students demonstrate a high level of cognitive interest (Cedere, Jurgena, Helmane, Tiltiņa-Kapele, & Praulite, 2015).

The studies mentioned above indicate that there are problems concerning the development of learners’ cognitive interest; therefore, according to the principles of complex adaptive systems, to get a more complete picture of the real situation, it is necessary to overcome dualism (teaching versus learning, cognitive versus affective, and a learner versus a teacher), and consider phenomena from different angles taking contextual factors into account (Briede, 2015).

It is important to be aware of the sociological context in which 9th grade students obtain education. Based on the studies of generational characteristics, scholars have concluded that Generation Z is the first generation raised in an uncertain and complicated global environment, in the world of developed information and communication technologies (ICT), where a different kind of information processing prevails. At present, the communication of 70% of the students is affected by its visual character (McCrindle, 2014); the internet has paved the way for Pxts (picture texts), where words have been replaced by symbols or universal icons (McCrindle, 2014). The means provided by ICT are natural tools for Generation Z, and they have an impact on how they understand the world, how they learn and communicate, and what kind of priorities they have. Young people can process information, but they often do not perceive the context in which this information should be interpreted (Mladkova, 2017).

The boundaries of using digital media are constantly expanding for Generation Z, and their culture of learning has changed. By expanding the virtual learning space, it should be considered that the technologies used will also affect the cognitive, social and emotional development of learners (Lee & Choi, 2017; Underwood & Farrington-Flint, 2015). It is pointed out in several studies that pedagogically justified use of technologies promotes active learning as it arouses interest, accelerates the working process and allows students to engage in the process of learning more actively compared to the traditional approach (All, Plovic, Patricia, Castella, & Looy, 2017; Barr, Pennycook, Stolz, & Fugelsang, 2015; Volk, Cotič, Zajac, & Starcic, 2017). At the same time, it is important to be aware that, constantly working with images in the digital environment, learners develop the so-called “clip thinking”, a short-term memory (Lee & Choi, 2017; McCrindle, 2014, p. 154). Moreover, the feeling of loneliness increases, and active participation in group work activities decreases (Dincer & Doganay, 2017).

The efficient use of ICT in learning science subjects makes it possible to enhance the effectiveness of education and create a more up-to-date and attractive learning environment. The supporters of the integrated approach suggest that teaching science subjects in the context of real-life problems can make the content of learning more relevant to students, which can help increase their motivation, generate interest and improve learning results (Honey, Pearson, & Schweingruber, 2014; Lamanauskas, 2011). Undoubtedly, teachers’ professionalism and the change of their teaching paradigm play the key role in the development of the new politics of education (Flogie, Dolenc, & Aberšek, 2015). Scholars put particular emphasis on the role of e-learning, which changes the possibilities of learning (Kapenieks, 2016; Kapenieks & Salite, 2012).
The aim of the study is to explore the learners’ cognitive interest, personal participation and the approaches chosen by teachers according to students’ subjective assessment.

Methods

Instruments

The data analysed in the present article were obtained in the study carried out in the period of 2015–2017. The survey used in the study characterises students’ subjective evaluations of the correlation between their personal participation and cognitive interest in the subjects of biology, chemistry, physics and mathematics, and the approaches used by teachers in the process of learning. The survey was designed based on the studies performed earlier (Cedere, Jurgena, Helmane, Tiltīņa-Kapele, & Praulīte, 2015) and documents regulating education in Latvia (Latvijas Republikas Ministru kabinetu, 2013); as well as the teaching methods recommended by the National Centre for Education (Valsts izglītības satura centrs) were included in the survey. The survey was focused on students’ understanding of the importance of the knowledge and skills related to natural science in real life. It enabled the authors of the study to clarify how the learners evaluate their cognitive interest in natural science subjects and mathematics, and how they understand the nature of science, which their main areas of interest are, and which methods are the most helpful in their learning. The survey included both open-ended and closed items. The four-point Likert scale was used for fixed response items, with responses ranging from 1 ‘no’ to 4 ‘yes’.

Cronbach alpha was used to establish the reliability of the survey. According to Cronbach’s alpha coefficient, the reliability (inter-item consistency) of the questionnaire was 0.91.

The mean values of the responses M (1 ≤ M ≤ 4) and standard deviations (SD) were used to characterise the answers given by the respondents.

Participants and Procedure

The participants of the survey were 9th grade students from 17 Latvian schools with the total number of respondents 536. The average age of the respondents was 15.3 (SD=0.63).

The survey was prepared online, using the Google disc, and the respondents also completed the survey online. All the respondents participated in the survey voluntarily. The responses were anonymous; the data were used only in a processed form.

Results of Research

By means of the survey, there were obtained data characterising learners’ attitude to natural science subjects and the process of learning in general – the approaches used by teachers and students’ involvement in the process of learning in the context of transdisciplinarity.

The results of the student survey showed that cognitive interest in the subjects of natural science was not high (see Fig. 1). Figure 1 shows that the students like biology lessons most of all (M=2.89), which means that the average response chosen by the
The Prospects of Transdisciplinary Approach to Promote Learners’ Cognitive..

respondents is mostly yes. The average response concerning interest in the other three subjects was between mostly no and mostly yes.

Looking at the distribution of the responses (Fig. 2), it appears that very few students do not like biology, but the opinion is mixed about mathematics – a significant number of those surveyed have a negative attitude, but most of the respondents like it. The number of the positive responses (yes and mostly yes) was the following: biology – 36.4% and 27.8%, chemistry – 28.4% and 18.2%, physics – 33.6% and 20.1% and mathematics – 30.5% and 26.8% of the respondents. Consequently, most of those surveyed gladly study natural science and mathematics, and they do not experience significant difficulties studying them, but the fact that almost a half of the samples have no interest in studying these subjects (answers no and mostly no) is alarming. The respondents’ comments imply that the students believe they will not need natural science in their lives, and these subjects “do not come easy” to them.

Figure 1. Students’ interest in studying natural science and mathematics, the mean values of the responses (N=536)

Figure 2. Distribution of the students’ responses regarding their interest in studying natural science and mathematics (N=536)
To characterise students’ interest in natural science, the mean values (M) of the most characteristic responses and their standard deviations (SD) are summarised in Table 1. It appears that the students have a relatively high interest in natural phenomena (rain, thunderstorm, volcanoes, etc.) and the willingness to explain them (M=2.96). The desire to discover the causes of natural phenomena and processes (M=2.81) or analyse real-life problems within the context of natural science (M=2.81) appears to be lower. Students’ interest in solving such problems decreases when mathematical calculations need to be used to solve them (M=2.12). The responses to the question whether their leisure time is related to natural science show the lowest mean value (M=1.91 and 1.90).

Table 1
Students’ Interest in Natural Science Ranked According to the Mean Values of the Responses (N=536)

<table>
<thead>
<tr>
<th>Code</th>
<th>Items</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4</td>
<td>Explaining natural phenomena</td>
<td>2.96</td>
<td>0.81</td>
</tr>
<tr>
<td>A5</td>
<td>Finding out the causes of natural phenomena</td>
<td>2.81</td>
<td>0.79</td>
</tr>
<tr>
<td>A6</td>
<td>Analysing problems related to the real life</td>
<td>2.76</td>
<td>0.88</td>
</tr>
<tr>
<td>A9</td>
<td>Enthusiasm for natural science</td>
<td>2.57</td>
<td>1.04</td>
</tr>
<tr>
<td>B11</td>
<td>Exploration of relationships of math with real life problems</td>
<td>2.23</td>
<td>1.13</td>
</tr>
<tr>
<td>B13</td>
<td>The use of maths in solving practical tasks</td>
<td>2.16</td>
<td>1.13</td>
</tr>
<tr>
<td>A14</td>
<td>Devoting the leisure time to science exploration</td>
<td>1.91</td>
<td>0.96</td>
</tr>
<tr>
<td>A8</td>
<td>Exploration of nature outside the school</td>
<td>1.90</td>
<td>1.02</td>
</tr>
</tbody>
</table>

The second group of items shows the teaching methods which helped the students most in learning science subjects. The survey included various kinds of teaching methods practiced in Latvian schools (Valsts izglītības satura centrs). The methods used in teaching mathematics are specific, and they are not included in the study. The responses concerning the teaching methods that were reported as the most helpful ones for the acquisition of natural science subjects are summarised in Table 2.

Table 2
Students’ Assessment of Teaching Methods Used in Natural Science Subjects Ranked According to the Mean Values of the Responses (N=536)

<table>
<thead>
<tr>
<th>Code</th>
<th>Methods</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>Demonstrations</td>
<td>3.55</td>
<td>.82</td>
</tr>
<tr>
<td>C5</td>
<td>Laboratory work</td>
<td>3.39</td>
<td>.87</td>
</tr>
<tr>
<td>C4</td>
<td>Questions and answers</td>
<td>3.33</td>
<td>.88</td>
</tr>
<tr>
<td>C3</td>
<td>Discussion</td>
<td>3.29</td>
<td>.93</td>
</tr>
<tr>
<td>C12</td>
<td>Teacher’s lecturing</td>
<td>3.21</td>
<td>.95</td>
</tr>
<tr>
<td>C6</td>
<td>Laboratory research work</td>
<td>3.19</td>
<td>1.00</td>
</tr>
<tr>
<td>C15</td>
<td>Using visual aids</td>
<td>3.13</td>
<td>1.01</td>
</tr>
<tr>
<td>C9</td>
<td>Problem solving</td>
<td>3.03</td>
<td>.99</td>
</tr>
<tr>
<td>C10</td>
<td>Case study</td>
<td>3.02</td>
<td>.99</td>
</tr>
<tr>
<td>C16</td>
<td>Making visual aids</td>
<td>2.81</td>
<td>1.05</td>
</tr>
</tbody>
</table>
Thus, demonstrations performed by a teacher appear to have been more helpful than laboratory work where learners must perform experiments themselves (M=3.55 and M=3.29, respectively). Active students’ participation in the process of learning is known to be more productive than passive observation, but the results of the study imply the opposite. It could be because the students had performed laboratory experiments so seldom that the contribution of laboratory work to their learning was negligible. The post-survey comments confirm this assumption. A lot of students pointed out that there should be more laboratory work in physics and chemistry, and then the lessons would be more interesting. In general, all the teaching methods characteristic of natural science are regarded as useful by the respondents. Nevertheless, the methods requiring more effort showed lower values than simple laboratory work (M=3.39 and M=3.19), problem solving (M=3.03) and case study (M=3.02). Analysing students’ post-survey comments, another reason appears – these methods are used in class so seldom that they do not help students much in acquiring the content of learning.

It can be concluded that teacher’s activity dominates in the lessons of natural science, which is also confirmed by respondents’ comments, and students’ activity in the lessons is rather low. Consequently, the schools are not ready for the transition to the trans-disciplinary approach, so a radical methodological change and a different approach are needed, which teachers must be prepared and trained for.

Students’ interest in cognizing and exploring various phenomena related to nature and everyday life, analysing and establishing the causes of various problems allows using various teaching approaches. In general, students appreciated the teaching methods used in class, but they also admitted that they had no interest in these subjects (except for biology). It means that although teachers use various methodological techniques, and students are given opportunities to acquire the kinds of cognition characteristic of natural science and develop their skills in accordance with the school curriculum, a broader contextual solution is necessary for promoting students’ cognitive interest.

Respondents’ post-survey comments showed the diversity of students’ views. Most of them understood the nature of science and recognised the importance of these subjects. The following comment written by a respondent illustrates it very well: “Biology, chemistry and physics are very interesting subjects. In these lessons, we can learn a lot of new things about the world around us and the objects and phenomena we encounter in our daily lives.” Some comments imply students’ willingness to learn more actively and engage in practical learning activities, for instance: “The lessons should be more interesting, not just sitting and calculating”; “I’d like to have more experiments in class to make the lessons more interesting and easier to understand”; “There should be more laboratory work in chemistry and physics.” The number of students expressing the opposite opinion is smaller: “I don’t like physics and chemistry very much”; “I hate natural science...”; “I don’t understand why we should study natural science and mathematics more than art and music. I’m not good at chemistry and physics, but I’m good at arts...”.

Students’ post-survey comments imply that most students lack confidence in their abilities, the capacity of self-reflection, the desire to be successful and the confidence in their ability to succeed: “There shouldn’t be any homework...”; “We shouldn’t be required to learn what does not come easy to us”; “I’m not good at chemistry and physics, but I’m good at arts...”. These responses only confirmed the lack of cognitive interest established above and learners’ unwillingness to delve into the topic to understand it.
Discussion

The study concerns some aspects of the transdisciplinary approach and gives an insight in the views of 9th grade students concerning natural science and their formation in contemporary schools.

As to the question which teaching methods are most helpful for students in their learning, the study provides additional arguments for the discussion why demonstrations performed by the teacher where learners are passive observers appear to be more helpful than the experiments performed by students. The study identified the need for changing the teaching approaches, which also corresponded to the conclusions given in academic literature (Krapp & Prenzel, 2011; McCrindle, 2014; Osborne, 2014; Pešakovičs, Flogie, & Aberšek, 2014, etc.).

It is important to understand the sociological context within which the 9th form students obtain education. According to the studies of generational characteristics, Generation Z is the first generation raised in the uncertain and complicated global environment, in the world of developed ICT technologies, where a different way of information processing predominates. The boundaries of using digital media are constantly expanding for Generation Z, and their learning culture has changed. Broadening the virtual learning space, it should be considered that the technologies used at the same time will have a different impact on the cognitive, social and emotional development of learners (Lee & Choi, 2017; Underwood & Farrington-Flint, 2015).

The study clearly demonstrates that students are interested in solving real problems, whereas lessons in science subjects do not give them satisfaction, and a large number of the students do not regard natural science as useful for them. To make learning productive, it is necessary to adopt the transdisciplinary approach in the process of learning/teaching, which means exploring some important real-world issues or situations by integrating the perspectives of various disciplines (Flogie & Aberšek, 2015; Lee & Choi, 2017).

These contexts expand the field of learning, and they have the potential of deepening learning; at the same time, they can cause problems for learners. For instance, there is evidence (Honey, Pearson, & Schweingruber, 2014) that, using detailed, specific situations including the abundant development of perception, learners cannot identify abstract structural characteristics necessary to transfer their experience to another situation.

Regarding the low rating given for the methods requiring effort and learners’ active participation, it is important to understand students’ motivation and goals. They include not only the desire for success, but also the desire of avoidance. It can be a challenge for educators. As to the students whose motivation is not so highly developed, or whose motivation is avoidance, the change of pedagogical approaches alone will not give the desired result. At present, the schools put emphasis on identifying mistakes, which stimulates the avoidance strategy and affects students’ choices – to study those subjects that come easier to them and to resist the learning activities where they need to concentrate their attention for a long time, put in effort, and where positive results cannot be achieved soon (Cedere, Jurgena, & Kalnina, 2017; Jurgena, Cedere, & Keviša, 2015; Migdley & Urdan, 2001).

From our perspective, students’ subjective opinions on the factors that cause interest in some subject or learning method is the issue concerning learners’ self-determination.
In the contemporary society of internationalized and technologized production and services, there is a need for new abilities, which brings the notions of learners’ “self-organization”, “self-regulation” and “self-responsibility” to the foreground. Special attention is paid to the subject, i.e., a human being consciously engaged in certain activity. “Focusing on a subject” is a general trend (Hozkamp, 1995, p. 5).

At present, the opinion dominant in the school practice suggests that the process of learning should be organized in a different way, but it does not provide a complex solution to the problem because, from subject’s perspective, learning cannot be reduced to the organization of the process of learning, especially if it is determined from the outside. Learning cannot be reduced to the methods of learning either. It involves much more than the act of learning itself. It starts with dividing the object of learning into constituent parts done by the subject and setting learning goals. A teacher cannot demonstrate it to learners; it is done by the subjects of learning. This understanding of learning requires the subjective reason for learning/not learning and puts emphasis on individual’s participation.

Therefore, regarding students’ learning, it is necessary to speak not only about content, but also about learning strategies. Each discipline has corresponding learning methods. Finding a method that fits both the object and the person is a specific learning objective. It is the problem concerning learner’s activity that can only be solved by learning. The subject of learning does not necessarily have to use the offered special didactics or psychological learning theories. Individual learning methods and techniques can be developed and used equally well. Besides, each learner has his/her own learning experience based on which certain learning interests have been formed and generalized (Helds, 2006).

It agrees with the studies suggesting that certain incomprehension (Flogie, Dolonec, & Aberšek, 2015) and dualism (Briede, 2015) can be observed in the school practice concerning the organization of the process of teaching/learning nowadays. It actualizes the need for using the transdisciplinary approach.

The Limitations of the Study

As the empirical study concerns the opinions of the Latvian 9th grade students about the development of cognitive interest in the acquisition of natural science subjects, the authors of the article do not attempt to evaluate and interpret the results of the study in a broader context.

The study reveals the opinions of the 9th grade students at the institutions of general education, and it can be used as the basis for further research concerning the implementation of the transdisciplinary approach in school practice. The results of the study imply that it is necessary to conduct further studies and set the directions of practical activity – to conduct an international comparative study to evaluate and adopt the models of best practice.

A lot of students are willing for more interesting lessons, which depends not only on teacher’s professionalism, but also on the material and technical possibilities of the school. Judging from students’ comments, the lessons are often monotonous, and the students are not actively involved in the process of learning. Unfortunately, this is the current situation. Regularly faced with students’ indifference and unwillingness to learn, on the one hand, and the low prestige of their profession in society, on the other hand,
a lot of teachers develop a formal attitude to their job. It seems questionable whether these teachers should call themselves pedagogues.

Conclusions

The study shows the complex interaction of three phenomena – learner’s cognitive interest, personal participation and the approaches used by a teacher. The present research provides a new perspective and an opportunity for the study of the phenomenon of sustainability from the wider angle of the interaction of various processes, which will require a holistic (transdisciplinary) view on the development of complex phenomena and their interaction in the acquisition of natural science subjects at school.

It is difficult to evaluate the development of learners’ cognitive interest in studying natural science subjects at school and its interconnection with learners’ personal participation and the approaches chosen by teachers due to the complex structure of these phenomena. Nevertheless, there is a relationship between learner’s cognitive interest, personal participation and the approach chosen by the teacher.

According to students’ subjective evaluations, the approach focused on teaching constructivism corresponds to the trends of sustainable education, but the overall context where the development of students’ personalities takes place indicates that the system experiences problems with regard to its sustainable development, and the transdisciplinary approach could potentially be used to understand the specific features of the development of learners’ cognitive interest in studying natural science subjects at school.

It can be concluded that the students have the potential for interest necessary to understand the nature of science and acquire the knowledge and skills important for their future lives. It is necessary to look for new, appropriate methodological techniques. Using the transdisciplinary approach, the students would form the notion of the material world based on interconnected knowledge as the foundation for future scientific cognition.

References


Muravská, T., & Ozoliņš, Ž. (Eds.) (2012). *Starpdisciplinaritāte sociālajās zinātņās: vai tā sniedz atbildes uz mūsdienu izaicinājumiem augstākajā izglītībā un pētniecībā [Transdisciplinarity in social sciences: does it provide answers to contemporary challenges in higher education and research]? Rīga: LU Akadēmiskais apgāds.


Weinberger, D. (2011). *Too big to know: Rethinking knowledge now that the facts aren’t the facts, experts are everywhere, and the smartest person in the room is the room*. New York, NY: Basic.


Correspondence concerning this paper should be addressed to Dr. paed. Inese Jurgena, Faculty of Education, Psychology and Art, University of Latvia, Imantas linija 7/1 str, LV-1083, Riga, Latvia. Email: inese.jurgena@lu.lv
Learning to Be:
Teachers’ Competences and Practical Solutions:
A Step Towards Sustainable Development

Somayyeh Ghorbani, Seyed Ebrahim Mirshah Jafari,
and Fereydoon Sharifian
University of Isfahan, Isfahan, Iran

Abstract
The purpose of the present study is to determine teachers’ professional competences in “learning to be” and provide practical solutions for its realization. The research employed a mixed-methods sequential explanatory design and was conducted through two qualitative and quantitative methods. The population of the qualitative research consisted of educational experts, among whom 20 participants were selected through the purposive sampling technique after conducting interviews and data saturation. The population of the quantitative research included high school teachers in districts 2 and 3 of Isfahan among whom 217 holding MA, MSc, and PhD. degrees were selected via purposive sampling technique. In the qualitative section, the data collection instrument was semi-structured interview, and in the quantitative section, a 14-subscale researcher-made Teacher Professional Competences Questionnaire. Findings of the qualitative section were categorized into teachers’ cognitive competences, educational and managerial skills, and scientific, attitudinal, skill, behavioral, and general competences. From teachers’ viewpoints, the most important competences in “learning to be” was their ability to develop self-esteem and self-confidence in students, ability to increase personal skills such as self-awareness and self-belief in students, and their ability to guide students to determine the valuable goals for their lives. There was a consensus among views of experts and teachers about professional competences. There were no differences in the teachers’ opinions regarding the demographic characteristics of professional competences. Practical solutions of this learning approach were categorized by educational experts into solutions related to teacher education strategies, educational-training modalities, and the involvement of effective factors.

Keywords: UNESCO, high school, teacher professional competences, learning to be, practical solutions
Introduction

Education is intrinsically linked with human development and is a key factor in addressing poverty reduction, health improvement, sustainable livelihoods and environmental sustainability. This is reflected in the international community’s commitment to the four United Nations-led initiatives to promote education and development: the Millennium Development Goals (MDGs), Education for All (EFA), the United Nations Literacy Decade (UNLD, 2003–2012) and United Nations Decade of Education for Sustainable Development (DESD, 2005–2014). Education for Sustainable Development is an approach to teaching and learning “that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future” (UNESCO, 2002). It “prepares people of all walks of life to plan for, cope with, and find solutions for issues that threaten the sustainability of our planet,” and encourages “changes in behavior that will create a more sustainable future” (UNESCO, 2005). ESD is not a completely new educational framework. To put it simply, ESD promotes five types of learning as the basis for fostering sustainable development. These are: “Learning to know, learning to do, Learning to be, Learning to live together, Learning to transform oneself, and society” (UNESCO, 2008, p. 8). The International Commission on Education for the Twenty First Century, also known as the Delores Report, proposed four pillars of learning (i.e., learning to know, learning to do, learning to be, and learning to live together as ‘foundations of education’ and ‘fundamental types of learning in the reorganization of education in the twenty-first century’). These pillars are coherent, interrelated and encompassing, and ‘all form a whole because there are many points of contacts, and exchange among them’, and they relate inclusively to phases and areas of education that complement and interpenetrate each other (UNESCO, 1996).

- **Learning to know** is the understanding and use of knowledge. Related abilities include critical thinking, problem solving, and decision-making life skills which are fundamental to informed action.

- **Learning to do** is linked to the mastering of cultural tools, i.e. objects or patterns of behaviour, in order to act. The related abilities are linked to the practical application of what is learned and need to be associated with life skills in a teaching learning situation.

- **Learning to be** concerns the concept of agency. Related abilities include life skills for coping, self-awareness, esteem, confidence, aiming at building an identity, valuing oneself, setting goals, etc.

- **Learning to live together** implies feeling affiliated to a group, a category, a society, a culture, understanding, and respecting differences. Related interpersonal abilities include communication, negotiation, and refusal life skills, etc., which are essential to define a person as a social being, in constant interaction with the world (Hoffmann, 2006). The four pillars of learning proposed by the Delores Report are very relevant to the tenets of ESD. They are mutually supportive as they essentially contribute towards sustainable human development (Bory-Adams & Hoffmann, 2005; Lawale & Bory-Adams, 2010). In the current circumstances of education, the pillar of ‘learning to be’ occupies a fundamental focus on education. It is like the central pillar of a canopy. Its attainment needs a new force with special inputs.
Learning to be

This learning pillar was conceptualized by Edgar Faure in report ‘Learning to Be’: The World of Education Today and Tomorrow, published by UNESCO in 1972 (UNESCO, 1996). Learning to be is based on this principle that the aim of development is the full realization of a human with all the elements of personality, the complexity of his modes of manifestation, his various obligations as individual, member of the family and society, citizens and producers, the innovator of techniques, and creator of new ideas. This learning approach may be interpreted as a way of learning to be humanized via the acquisition of knowledge, skills, and values leading to the development of personality in all physical, cultural, social, and intellectual aspects. Learning to be means that the purpose of the curriculum should be to develop capabilities such as imagination and creativity, the acquisition of universal human values, the developmental aspects of personal abilities such as memory, reasoning, moral sentiments, physical capacity, social and communication skills, development of critical thinking, exercising independent judgment, and developing commitment and responsibility (Zhao, 2005). Learning to be is based on the viewpoint of humanism in education. The aim of education in humanism is the learner’s comprehensive development for a productive and constructive life in which skills and attitudes are continually modified, developed and used as part of lifelong learner learning (UNESCO, 2002).

Teachers have the most highlighted contribution in students learning as well as the effectiveness of the educational systems (Gholami & Qurbanzada, 2016). Teachers will be most instrumental to inculcate human values and improve values education. While learners should be at the center of educational processes, teachers play critical roles as guides or learning facilitators. At a time when the world is under the threat of violence and terrorism, teachers can no longer afford to claim education to be ‘value-free’; educators should no longer shun the moral responsibility for teaching universally shared human values conducive to a culture of peace as well as an all-round human development. The challenge is to design diversified educational materials and approaches suitable to the varied needs of children and adolescents with respect to their physical and psychological development characteristics. Improving the competence in teaching values for ‘learning to be’ will demand that teachers prepare themselves in an entirely different fashion and emphasis. The teacher needs to assist young students to feel good about themselves; to be emotionally secure and self-confident, to respect themselves and others, and to take full responsibility for their actions. Therefore, teachers will have to look at education from very broad, flexible, and interdisciplinary perspectives (UNESCO, 2002).

The recent World Commission on Teaching pointed out that our teachers, in order to help students, not only should have the skills making teaching and examination easier, but also, more importantly, ways of thinking (creativity, critical thinking, problem solving, decision making, and learning) ways of working (communication and collaboration), tools of working (communication and information technology), skills in the domain of citizenship, life skills, occupation, and personal and social responsibility for success in modern democracy should also be discovered (OECD, 2011). Teachers beliefs, practices, and attitudes are closely related to teachers’ strategies used to cope with challenges that they encounter in their profession, and they also influence learners learning environment, motivation, and achievement (Gholami, Sarkhosh, & Abedi, 2016). Utilizing educational strategies such as the formulation of purposive and smart questions, conscious
selection of educational subjects, process-centered teaching methods based on students’ meta-cognitive development, development of a questioning spirit, critical thinking, exploratory learning opportunities, valid scientific sources, comparison of ideas, discussions about the subject, and communication with students in a collaborative and cooperative environment, teachers try to increase their students’ learning levels (Costa & Lowery, 1989; Driscoll, 2000; Hewson, 1996; Marzano, 1989; Meichenbum, 1986; Persichitte, 1993; Pintrich, 1990).

Considering that teachers are key elements in the educational system and play a significant role in the proper socialization of the youth for sustainable development (UNESCO, 2008), they should acquire necessary professional competencies how to teach students this pillar “learning to be”. Eslamian, Jafari, and Neyestani (2018), Korsun, (2017), and Reid and Hovrathora (2016) state that achieving sustainable development requires competent teachers, and that attention to improving the professional competencies of teachers is considered a step towards sustainable development. White (1959) introduced the term ‘competences’ to describe the knowledge, abilities, skills and features of the personality necessary to perform the work qualitatively and allowing forecasting the individuals successful professional activity in the future (Boyatzis, 1982; Mitrani et al., 1992; Reynal & Rieuner, 1997; Spencer & Spencer, 1993; Spector et al., 2006; Stoof et al., 2002; UNIDO, 2002; Tigelarr et al., 2004). Professional competence is defined as a set of potential behaviors (cognitive, emotional, and psychomotor behaviors) enabling an individual to effectively implement a complex activity. Being competent in a profession indicates the use of specialized information, analysis and decision making, the use of creativity, working with others as a team member, communicating effectively, adapting to the work environment, and dealing with unforeseen circumstances. Competences through sustainable knowledge, skills and the ability to use them to develop specific activities and to obtain successful results are confirmed by others (Miheala, 2015). Accordingly, the present study aims at determining the professional competencies required by teachers to attend to “learning to be” and provide practical solutions to achieve it.

**Review of Literature**

A lot of studies have been conducted to examine the professional competencies and development of criteria designed for determining those competencies (Danilson, 2001; George Town College, 2010; Singapore teacher Education Model for the 21st Century, 2012; UNESCO, 2011). Each study classifies the teachers’ competencies into different categories and examines them from different perspectives (Castro et al., 2005; Cheetham & Chivers, British Columbia, 2004; Cochran & Smith, 1999; Darling Hammond, 2006; Darling Hammond & Bransford, 2005; Darling Hammond et al., 2005; Darling Hammond & Snowden, 2007).

Handrik et al. (2017) categorized teacher competences into the following groups: (1) pedagogical competences including understanding the students’ characteristics, understanding learning theories, developing lesson plans, facilitating (flourishing) students’ intrinsic talents, communicating with students, organizing the evaluation and assessment process, applying evaluation and assessment results, improving the quality of reflective learning. (2) Social competences include to act fairly means to be fair and just; and to be comprehensive means to have a holistic and inclusive view, not to discriminate, to
communicate effectively, and to conform to work tasks. (3) Specialized competences include understanding structure, concepts, and scientific thoughts supporting educational subjects, identifying criteria of basic professional competences and competencies, and mastering the subject or discipline they teach.

Zhu and Wang (2014) categorized teacher professional competences into learning competency (learning actively, learn with an open mind, learn from reflection, learn with independent thinking), social competency (communicative, cooperative, courageous, persistent, democratic), educational competency (love for teaching, responsible, knowledgeable, problem sensitivity, quick response, educational research), technological competency (use internet to search and extract information, use ICT and multimedia in education). Selvi (2010) identified competences as fields of study competences, research competences, course competences, lifelong learning competences, socio-cultural competences, emotional competences, ICT competences, and environmental competences.

Makarevics (2008) categorized professional competences of future teachers into the following groups: 1) The peculiarities of the scientific approach: behavioral, functional, and multidimensional approaches to understanding of competences; 2) The forms of psychological activity connected with the temporal continuum; 3) The types of interrelation with the environment that includes: a) educational-cognitive competences or the sum of abilities and skills of cognitive activity; mastery of mechanisms of planning, analysis, reflection, self-evaluation of success; mastery of actions in non-standard situations, method of problem solving; mastery of measuring skills, using statistical and other methods of cognition; b) informational competences, or abilities to search, analyze, select, and process the necessary information independently with the help of information technologies; c) communicative competences or mastery of the skills to interact with the people, the ability to work in group, to perform different social roles; 4) The forms of carrying out professional activity.

Mishra and Koehler (2006) in a research titled “Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge”, presented a model for teacher knowledge. This model represents the process of building knowledge and reviewing teaching-learning experiences. In this model, the knowledge required by teachers, i.e. TPCK, includes content knowledge, educational knowledge, pedagogical content knowledge, and technological pedagogical content knowledge. Mishra and Koehler introduced content knowledge including knowledge of concepts, theories, ideas, conceptual frameworks, reasoning and evidence, and promising approaches. This model is the interconnected interface among content knowledge, education knowledge, and ICT knowledge, which has a synthesis and interdisciplinary nature that should lead to strategic thinking about time, location, and how to use ICT for guiding students to learn on a area of knowledge. Therefore, teachers should be able to design their learning experiences through ICT, organize contents enabling them to manage and share knowledge for themselves and their students, and facilitate the learning and fulfillment of individual and professional needs.

Huntly (2008) classifies the teacher competencies in three areas of professional knowledge, professional practice, and professional commitment. Professional knowledge includes content knowledge, student recognition, and teaching and learning awareness. Professional practice includes: learning design, creation of a learning environment, and measurement and evaluation of learning. Professional commitment includes: professional
learning, partnership, leadership, values, communication, and ethics. Hong et al. (2008) categorized teacher competencies into six main categories: intellectual ability, value system, interpersonal skills, management ability, professional ability, and personality traits.

Koster et al. (2005) classified teacher professional competences into five main categories and subcategories: 1) specialized knowledge including having the necessary information in the field of specialized knowledge and keeping it up-to-date; 2) communication including making communication with students with different backgrounds, guiding their duties, and analyzing and clarifying their views; 3) Organizing including determining the student performance system, managing time and organizing a curriculum in accordance with organizational goals; 4) Pedagogy, covers four factors including helping students and identifying learning needs, setting curriculum based on the needs of different students, designing activities for facilitating learners’ learning and development, and using information technology in teaching; and 5) Behavioral competences, including a democratic approach, proactive attitude (PA), curiosity about news, and honesty and integrity.

The British Columbia College of Teacher (2004) categorizes teacher professional competences in 13 basic components with sub-components: 1. Valuating and being interested in students as well as doing in line with their interests; 2. Understanding the role of parents and the environment in learners’ lives; 3. Having a broad knowledge basic and a deep understanding of subjects; 4. Having knowledge of the country and the world; 5. Being aware of the educational system in the country; 6. Identifying developmental stages; 7. Using teaching skills; 8. Effectively application of measurement, evaluation and reporting principles; 9. Doing practices as educational and ethical leaders; 10. Lifelong learning; 11. Having responsibility for the parents and the community; 12. Having responsibility for the profession; and 13. Having responsibility for students.

Shulman (1986) considers competent education factors as subject knowledge, content knowledge, teaching and learning knowledge, curriculum knowledge and educational experiences that are necessary for a competent teacher. Rosie (1999) provided a model for teachers’ professional competencies including knowledge required by teachers for education. This knowledge includes knowledge of real subjects, syntactic knowledge, knowledge of beliefs, curriculum knowledge, general pedagogical knowledge, model knowledge for learning, learners (cognitive and emotional) knowledge, curriculum knowledge, self-knowledge, educational texture knowledge, knowledge of educational goals, and educational content knowledge.

**Research Questions**

1. What are the teachers’ professional competences in realizing the “learning to be” approach from the educational experts’ perspectives?
2. What are the teachers’ professional competences in realizing the “learning to be” approach from high school teachers’ perspectives?
3. Is there any significant difference among teachers’ perspectives in terms of demographic characteristics regarding teacher professional competences?
4. What are the solutions for realizing the “learning to be” approach from educational experts’ perspectives?
Methodology

The research method employed in the present study is mixed methods (qualitative and quantitative methods for its different sections). In the qualitative section, using the grounded theory, the data was extracted via semi-structured interviewing technique. Grounded theory is a research method for data analysis, in this method, using a set of data, a theory emerges. When we need a theory to explain a process, and existing theories do not explain such a process, grounded theory is the method which can formulate a theory about the occurrence of this process, the problem, or the individuals being observed. Additionally, they will also be used to get a glimpse of what they are aware of. This method is used to uncover the less well-known phenomena and see what lies behind them, and has three main approaches to encoding open, central coding and selective coding (Straus & Corbin, 2008, p. 187). In this section, the data about teacher professional competencies in the learning to be was gathered through semi-structured interviews with education professionals, then qualitative findings from the interviews, in addition to answering research questions, were used to design a quantitative research instrument. Accordingly, the exploratory sequential mixed methods design was employed in the present study. Creswell (2003; quoted by Greene, 2007, p. 5) introduced some of the developed designs of the mixed methods research including three explanatory, exploratory and transformational sequential projects, and three multilateral, integrated, and transformational schemes. In the exploratory design, first qualitative data and then quantitative data are collected and analyzed. Accordingly, at first, a phenomenon is analyzed precisely, and then quantitative data is used to determine the relationship of the qualitative data, and quantitative data builds quantitative data. Thus, in this research design, the researcher emphasizes qualitative data rather than quantitative data; the data collection sequence is qualitative and then quantitative data, respectively.

The researcher resorts to quantitative data to determine the qualitative findings. Histogram 1 illustrates the exploratory research sequence. This design is employed for several reasons: 1. The researcher needs to develop an instrument for research, 2. When the researcher intends to identify unknown major variables for study quantitatively; 3. When the researcher intends to generalized data to other groups, test different dimensions of a new theory or classification, or deeply explore a phenomenon, and then measure its generality. In the present study, both qualitative and quantitative approaches have been used.

![Histogram 1: mixed methods research design](image)

*Figure 1. Creswell and Plano Clark (2007, pp. 62–76)*
Population

Research population in the qualitative section consisted of the educational experts in Iranian universities and in quantitative section totaled 498 second high school teachers in Districts 2 and 3 of Isfahan.

Sample Size and Sampling

The primary sampling method used for selection of educational experts who possess valuable information in relation to the topic was the purposive and individual sampling techniques. In addition to the purposive sampling technique, the snowball sampling method was also used during interviews. In this method, informed people are consulted to introduce appropriate cases and subjects. In qualitative research, sample sizes do not matter, but indices such as data saturation and data repeatability and adequacy of the sample size are vital (Gall et al., 2004). After conducting semi-structured interviews with 20 educational experts who were faculty members of universities, the data saturation was achieved. For the quantitative section, the purposive and stratified sampling techniques were employed randomly among different districts of Isfahan. Then, second-level teachers holding MA/MSc and PhD were selected through the purposive sampling technique. The total population was 498 individuals among whom 217 participants were selected through Cochran formula. Out of received questionnaires, 13 defected questionnaires with more than 10 unanswered items, were excluded. Totally, the data extracted from 204 teachers were analyzed. The frequency distribution of the qualitative and quantitative samples are represented in Tables 1 and 2.

Table 1
Frequency Distribution of the Qualitative Sample

<table>
<thead>
<tr>
<th>University/organization</th>
<th>Field of study</th>
<th>Academic rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Curriculum studies</td>
<td>Philosophy of Education</td>
</tr>
<tr>
<td>Research Institute of Education (RIE)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Organization for Educational Planning (OERP) and</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Shahid Rajaee Teacher Education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>University</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farhangian University of Tehran</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Kharazmi University</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Allameh Tabatabaei University</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>University of Isfahan</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
Table 2
Frequency Distribution of the Quantitative Sample

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group</th>
<th>F</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>122</td>
<td>59.8</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>82</td>
<td>40.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA/MSc</td>
<td>189</td>
<td>92.6</td>
<td></td>
</tr>
<tr>
<td>PhD</td>
<td>15</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Years of service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–10 years</td>
<td>21</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>11–20 years</td>
<td>46</td>
<td>22.5</td>
<td></td>
</tr>
<tr>
<td>21–30 years</td>
<td>123</td>
<td>60.3</td>
<td></td>
</tr>
<tr>
<td>31 and longer</td>
<td>14</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Data Collection Instrument

Semi-structured interviews were used to collect data in the qualitative section. The interview form was designed by reviewing literature related to the subject and confirmed by some curriculum specialists (content validity) after modification. The reliability of the interviews (analysis, classifications, and results) was also confirmed after coding by supervisors and an expert in qualitative research. Data collection instrument designed in quantitative section was a researcher-made questionnaire with 14 closed-ended questions based on five-point Likert scale (very high, high, somewhat, low, and very low). Items were formulated based on the qualitative findings of the interviews and the literature review. The reliability of the scales was assessed through internal consistency and Cronbach’s alpha coefficient techniques. Results of the analysis illustrated that the Cronbach’s alpha coefficient for teacher professional competences in realization of the learning to be approach is 0.89. Validity of the questionnaire was confirmed by 5 faculty members of Isfahan University who were expert at curriculum studies.

Data Analysis Instrument

The data analysis method is divided into two sections: qualitative and quantitative research sections.

Qualitative Section

To answer the first and fourth research questions, qualitative data analysis was conducted using the content analysis or thematic content analysis method of the interviews. The interviews, including data collection (such as recording of content), data reduction, data inference, and data analysis, were conducted based on Krippend or ff’ method. Accordingly, the contents of the interviews were fully recorded, transcribed, typed, and entered into MAXQDA v-2008 to make data coding more convenient. Row-to-line interviews were reviewed and significant sentences related to the research question were noted. The main themes of meaningful sentences were extracted as codes and
categorized via the software program. The codes including similar concepts were categorized in one class. The researcher’s work continued to classify and revise the classes until the saturation of the classes. Then, a title was given to each class. With each new interview, a class might be revised and even merged with other classes, or even a new class could be created.

Quantitative Section

In the present study, to test the descriptive indices of each item, the frequency, mean, and standard deviations were employed to compare the frequency of each item using the chi-square test. The one sample t-test was employed to test the significance of each item, the independent t-test was used to compare the views of male and female teachers holding MA/MSc and Ph.D. degrees, ANOVA was employed to compare the views of teachers with different backgrounds, and internal consistency (Cronbach’s alpha coefficient) was used to assess the reliability.

Findings of Qualitative Research Section

Q1. What are teacher professional competences in realizing of “learning to be” approach from the educational experts’ perspectives?

During interviewing with 20 educational experts, the findings reached saturation and repetition. After coding and analyzing the content of the interviews, the findings were categorized into a general class of teacher professional competences with three main components of teachers’ knowledge, educational skills, and management and organizational skills. Results of the interview questions are presented separately in Tables 3 and 4.
Table 3  
Teacher Professional Competences from the Perspectives of Educational Experts

<table>
<thead>
<tr>
<th>Teacher professional competences</th>
<th>Subcomponents</th>
<th>Frequency of main subcomponents</th>
<th>Percentage of subcomponents</th>
<th>Selected speech evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ educational knowledge (42%)</td>
<td>Educational system</td>
<td>4</td>
<td>4%</td>
<td>Identifying the structure, goals and characteristics of the educational system</td>
</tr>
<tr>
<td>Philosophy of education</td>
<td>4</td>
<td>4%</td>
<td>Identifying the philosophical views appropriate to the learning to be approach whose goal is to cultivate a perfect human being, a thinker, such as the school of humanism</td>
<td></td>
</tr>
<tr>
<td>Sociology</td>
<td>4</td>
<td>4%</td>
<td>Understanding the interactive relationship of society and education, paying attention to the structure of culture and society and dominant thoughts on society, recognizing political, economic, religious, and family institutions</td>
<td></td>
</tr>
<tr>
<td>Education methods</td>
<td>4</td>
<td>4%</td>
<td>Understanding the rules, regulations, styles of education and training of the perfect man who can handle life in this century.</td>
<td></td>
</tr>
<tr>
<td>Curriculum</td>
<td>4</td>
<td>4%</td>
<td>Identifying the objectives, features, principles and basics of curriculum planning and content analysis of the courses.</td>
<td></td>
</tr>
<tr>
<td>Resource identification</td>
<td>4</td>
<td>4%</td>
<td>Identifying diverse and up-to-date resources related to educational topics in learning to be skills</td>
<td></td>
</tr>
<tr>
<td>Knowledge, attitude, skill</td>
<td>4</td>
<td>4%</td>
<td>Integrated understanding of the knowledge, skills and attitudes that 21st century learners need to live.</td>
<td></td>
</tr>
<tr>
<td>Development theories</td>
<td>2</td>
<td>2%</td>
<td>Knowledge of the theory of development in education, such as Piaget’s cognitive development theory, the development theories presented by Erikson, Vygotsky etc.</td>
<td></td>
</tr>
<tr>
<td>Learning theories</td>
<td>2</td>
<td>2%</td>
<td>Understanding learning theories that emphasize social recognition and learning.</td>
<td></td>
</tr>
</tbody>
</table>

Sequel to Table 3 see on the next page.
### Teacher Professional Competences in the Learning to Be Approach

<table>
<thead>
<tr>
<th>Teachers’ knowledge (42%)</th>
<th>Life skills</th>
<th>2</th>
<th>2%</th>
<th>Understanding decision-making, problem solving, creative thinking, critical thinking skills, making effective relationships with others, adaptive interpersonal relationship, self-empowerment, empathy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learners</td>
<td>2</td>
<td>2%</td>
<td>Understanding all the dimensions and potentials of learners such as their physical, intellectual, moral, aesthetic, ethical, economic, and cultural, spiritual, religious, dimensions.</td>
<td></td>
</tr>
<tr>
<td>Assessment methods</td>
<td>2</td>
<td>2%</td>
<td>The teacher should have enough knowledge about a variety of assessment methods tailored to the content of the training and the level of learners.</td>
<td></td>
</tr>
<tr>
<td>Effective activities</td>
<td>2</td>
<td>2%</td>
<td>Understanding of social-educational activities affecting the development of students for a decent personal, occupational and social life.</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>2</td>
<td>2%</td>
<td>The present century is the age of information and communication explosions and technology. Therefore, recognizing new technologies and using them is a necessity for teachers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational skills (45%)</th>
<th>Instructional methods</th>
<th>10</th>
<th>10%</th>
<th>Having skills in teaching methods that bring students to self-awareness, self-confidence and self-esteem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reality-based teaching</td>
<td>8</td>
<td>8%</td>
<td>Teaching methods should link learning to be skills to everyday life issues and encourage students to debate and engage in life skills through discussions and contributions.</td>
<td></td>
</tr>
<tr>
<td>Facilitation</td>
<td>8</td>
<td>8%</td>
<td>The teacher should facilitate and guide the learning flow.</td>
<td></td>
</tr>
<tr>
<td>Instructional design</td>
<td>8</td>
<td>8%</td>
<td>Designing learning provisions that result in the personal and social transformation of students and encountering emotional interests, beliefs, values, and goals.</td>
<td></td>
</tr>
<tr>
<td>Instructional media</td>
<td>6</td>
<td>6%</td>
<td>Selecting and using diverse and different educational media, such as story, educational film and etc.</td>
<td></td>
</tr>
<tr>
<td>Assessment methods</td>
<td>5</td>
<td>5%</td>
<td>Having the skill to use self-assessment methods and self-evaluation by students themselves to gain self-awareness develop self-concept.</td>
<td></td>
</tr>
</tbody>
</table>

| Management and organization (12%) | Psychological atmosphere | 6 | 6% | Provide an environment full of trust, mutual respect, cooperation friendship and compassion. |

Sequel to Table 3 see on the next page.
<table>
<thead>
<tr>
<th>Teacher personal competences</th>
<th>Physical atmosphere</th>
<th>4</th>
<th>4%</th>
<th>Organizing learning environments that bring physical and mental mobility and the development of social spirit.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate scheduling</td>
<td>2</td>
<td>2%</td>
<td>Utilizing timely and coordinated schedules and maintaining routines and common methods throughout the class.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4**

*Teacher Personal Competences from the Perspectives of Educational Experts*

<table>
<thead>
<tr>
<th>Teacher professional competences</th>
<th>Main component and its percentage</th>
<th>Subcomponents</th>
<th>Frequency of subcomponents</th>
<th>Subcomponents percentage</th>
<th>Selected speech evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scientific (20%)</td>
<td>Lifelong learner</td>
<td>5</td>
<td>13%</td>
<td>While a teacher teaches students to learn, he or she should learn from and learning should be his/her habit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Researcher</td>
<td>5</td>
<td>11%</td>
<td>The teacher should seek new methods and new resources to improve and develop the students’ levels of learning and advancement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scientific competency</td>
<td>5</td>
<td>9%</td>
<td>Teacher should be: scientifically competent about what he/she teaches, he will reach the level of academic mastery from the discipline and field of study.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reflective</td>
<td>5</td>
<td>8%</td>
<td>Teacher should be: a thoughtful agent, critical, creative, conceptual, and analytical.</td>
</tr>
<tr>
<td></td>
<td>Attitudinal (43%)</td>
<td>Creativity and innovation</td>
<td>8</td>
<td>5%</td>
<td>Innovative and creative attitudes towards providing new educational ideas and methods.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participatory spirit</td>
<td>8</td>
<td>8%</td>
<td>Having group activities and collective capacity, provide educational opportunities for students’ participation with teachers and other students.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional commitment</td>
<td>8</td>
<td>8%</td>
<td>Teacher should be committed to professional standards and job responsibilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accepting values</td>
<td>8</td>
<td>8%</td>
<td>Admit ethical, religious, spiritual, and cultural values of the society.</td>
</tr>
</tbody>
</table>

*Sequel to Table 4 see on the next page.*
<table>
<thead>
<tr>
<th>Competence</th>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive and holistic</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Self-evaluator</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Compatibility</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Skill (15%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observer</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Good listener</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>Rhetoric</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Authority</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Behavioral (12%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverend and polite</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Stability</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Exemplar</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Flexible</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Motivated</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>General (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical health</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Psychological health</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Mental health</td>
<td>3</td>
<td>3%</td>
</tr>
</tbody>
</table>

Total: 100 | 100
Findings of Quantitative Research

Q2. What are teacher professional competences in the implementation of the “learning to be” approach form second high school teachers’ perspectives?

To evaluate the significance of teacher professional competences scores for realizing the learning to be approach for livelihood, teachers’ answers to each item were compared with value 3 using one-sample t-test. Table 5 indicates the descriptive statistics related to the 14-item teacher professional competences for realizing the learning-to-be approach, together with the results of the one-sample t-test:

Table 5
Teacher Professional Competences Needed by Teachers for Realizing the Learning to Be Approach

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Learning to be</th>
<th>Mean</th>
<th>SD</th>
<th>One-sample t-test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to increase personal skills of students such as self-awareness, self-belief</td>
<td>4.56</td>
<td>0.580</td>
<td>38.14</td>
<td>0.001</td>
</tr>
<tr>
<td>2</td>
<td>Ability to cultivate students’ self-esteem and self-confidence</td>
<td>4.60</td>
<td>0.580</td>
<td>39.31</td>
<td>0.001</td>
</tr>
<tr>
<td>3</td>
<td>Ability to guide students to determine their valuable goals for their lives</td>
<td>4.54</td>
<td>0.660</td>
<td>33.50</td>
<td>0.001</td>
</tr>
<tr>
<td>4</td>
<td>Ability to provide timely feedbacks on the students’ strengths and weaknesses</td>
<td>4.51</td>
<td>0.630</td>
<td>34.37</td>
<td>0.001</td>
</tr>
<tr>
<td>5</td>
<td>Knowledge of learning theories and their application in life skills training</td>
<td>4.43</td>
<td>0.660</td>
<td>30.78</td>
<td>0.001</td>
</tr>
<tr>
<td>6</td>
<td>Ability to discover students’ talents and lead them to flourish and develop</td>
<td>4.52</td>
<td>0.620</td>
<td>34.93</td>
<td>0.001</td>
</tr>
<tr>
<td>7</td>
<td>Ability to transfer beliefs and attitudes to students as useful and effective individuals in the society</td>
<td>4.47</td>
<td>0.600</td>
<td>35.98</td>
<td>0.001</td>
</tr>
<tr>
<td>8</td>
<td>Ability to educate students in all physical, cognitive, emotional and moral aspects</td>
<td>4.42</td>
<td>0.690</td>
<td>30.10</td>
<td>0.001</td>
</tr>
<tr>
<td>9</td>
<td>Ability to teach balance in all life affairs</td>
<td>4.53</td>
<td>0.720</td>
<td>27.87</td>
<td>0.001</td>
</tr>
<tr>
<td>10</td>
<td>Ability to teach life skills such as: flexibility, coping with negative emotions, coping with stresses</td>
<td>4.53</td>
<td>0.660</td>
<td>33.14</td>
<td>0.001</td>
</tr>
<tr>
<td>11</td>
<td>Ability to develop life skills such as: creative thinking, critical thinking, cultural and social awareness</td>
<td>4.50</td>
<td>0.630</td>
<td>33.44</td>
<td>0.001</td>
</tr>
<tr>
<td>12</td>
<td>Attention to the students’ emotions and feelings</td>
<td>4.46</td>
<td>0.650</td>
<td>32.83</td>
<td>0.001</td>
</tr>
<tr>
<td>13</td>
<td>Ability to teach adaptation and flexibility to environmental changes</td>
<td>4.45</td>
<td>0.710</td>
<td>29.33</td>
<td>0.001</td>
</tr>
<tr>
<td>14</td>
<td>Skills in teaching management and leadership in personal and professional life</td>
<td>4.45</td>
<td>0.770</td>
<td>26.97</td>
<td>0.001</td>
</tr>
<tr>
<td>Total mean scores</td>
<td>4.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of the one sample t-test (Table 5) show that the total mean scores of teacher’s views for all items of the professional competences in realizing the learning to be approach of 4.50 is significantly bigger than value 3. This means that, for the vast majority of teachers, the offered items, as teacher professional competences, are very significant in
realizing the learning to be approach. Among the items related to professional competences, “ability to cultivate students’ self-esteem and self-confidence” (2) with a mean scores of 4.60, “ability to increase personal skills of students such as self-awareness, self-belief” (1), of 4.56, and “ability to guide students to determine their valuable goals for their lives” (3) of 4.54 enjoy the highest priority for teachers to realize the learning to be approach. Other competences are also of great significance.

In this research section, teachers pointed out that they had skill levels and that competent teachers should have the skills to apply methods leading to problem solving, self-esteem, self-awareness, and self-confidence in students. Skills in how to deal with stress, emotions, teaching critical and creative thinking, and how to manage individual and professional life. As teachers notify, having skills competencies for teachers in this learning approach is a more significant dimension.

Q3. Is there any significant difference among teachers’ perspectives in terms of demographic characteristics regarding teacher professional competences?

To investigate the difference between the teachers’ opinions on the demographic characteristics (gender, level of education, and years of service), the mean, independent t-test, and F-test were employed. The results are presented in Tables 6 and 7.

Table 6
Demographic Characteristics (gender and level of education)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>Standard error</th>
<th>Independent t-test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>122</td>
<td>4.45</td>
<td>0.467</td>
<td>0.044</td>
<td>1.829</td>
<td>0.069</td>
</tr>
<tr>
<td>Men</td>
<td>82</td>
<td>4.58</td>
<td>0.479</td>
<td>0.052</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA/MSc</td>
<td>189</td>
<td>4.52</td>
<td>0.47</td>
<td>0.034</td>
<td>1.114</td>
<td>0.160</td>
</tr>
<tr>
<td>PhD</td>
<td>15</td>
<td>4.34</td>
<td>0.51</td>
<td>0.132</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7
Demographic Characteristics (years of service)

<table>
<thead>
<tr>
<th>Years of service</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>Standard error</th>
<th>F-test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–10</td>
<td>21</td>
<td>4.36</td>
<td>0.47</td>
<td>0.104</td>
<td>2.512</td>
<td>0.054</td>
</tr>
<tr>
<td>11–20</td>
<td>46</td>
<td>4.38</td>
<td>0.52</td>
<td>0.077</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21–30</td>
<td>123</td>
<td>4.56</td>
<td>0.45</td>
<td>0.040</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 and longer</td>
<td>14</td>
<td>4.64</td>
<td>0.32</td>
<td>0.086</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of Table 7, there is no significant difference between professional competences for realizing the, learning to be, approach. The independent t-test was employed for comparing the views of teachers holding MA/MSc and Ph.D. degree with regard to the professional competences. The results showed that there was no significant difference between the teachers’ views about professional competences in terms of the level of education.

To compare views of teachers with different years of service (1–10; 11–20; 21–30; and 31-longer) ANOVA was used. The results of which were shown in Table 7. There is no significant difference between teachers with different years of service about teacher professional competences.
Q4. What are the solutions for realizing the “learning to be” approach from educational experts’ perspectives?

After conducting interviews with 20 educational experts about the practical solutions for realizing learning to be. The data saturation was obtained after accurate analysis of the interview texts and coding, the findings obtained from the interviews were categorized into three main classes of reforming Teacher Education, the changes in educational-training methods, and cooperation of effective factors along with their subcomponents. Results are presented in Table 8.

As Table 8 illustrates, the findings of analyzing the interviews about realization of learning to be, approach are categorized into three main components of teachers’ education strategies, educational-training modifications, and the collaboration of effective agents.

Teacher Education

Regarding Teacher Education solutions, there was a belief that there should be changes in teacher recruitment so that the educational system should select the most qualified teachers in terms of their professional competences: teachers who have the required specialized knowledge and those who are motivated and willing to enter the profession of a teacher. Teacher Education programs are, according to interviewees, essential and necessary for revision and major developments in teacher education curricula. As a result, many of their curricula and their training should be updated. The curriculum content should be aimed at educating students to learn how to live and prioritize life, so it requires that many of the skills needed to live in the curriculum of teachers and Teacher Education be included. For example, training skills to solve conflicts, anger management, relationship management, learning to love, making relationships, etc. that students need to learn to be should be included in Teacher Education curricula. Briefly, Teacher Education should prepare teachers for the education of students in all of physical, mental, emotional, aesthetic, etc. aspects. This requires the development of curriculum and teaching methods. Action research, content analysis, narrative research, and internship courses can be very helpful if implemented correctly. Modifying assessment methods is another way via which teachers themselves assess their performance. The issue that our teachers should be aware of what kind of behavioral patterns a student needs to learn to be, such good behaviors, kindness, sympathy, politeness and respect, and many of the behavioral patterns of that are appropriate with this learning approach. Professional commitment is another Teacher Education method for making teachers aware that they are responsible for educating their students and bringing them to an appropriate level of knowledge, skills, and attitudes necessary to manage their lives. This training should such that after the completion of the training course they can practically use their learning in life, and in fact, the teacher is committed to know the proverb “I do not give the students fish, I will teach them how to catch fish”. Teachers should conduct their training in such a way that it can grow self-directed and self-regulating learners in life affairs.
<table>
<thead>
<tr>
<th>Solutions</th>
<th>Main components and percentage</th>
<th>Subcomponents</th>
<th>Frequency of component</th>
<th>Percentage of component</th>
<th>Selected speech evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Education (50%)</td>
<td>Modification of teacher recruitment</td>
<td>10</td>
<td>10%</td>
<td>Selecting and educating qualified teachers, those who have enough motivation for a teacherhood, and the teaching is their only job.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revision and transformation of curricula</td>
<td>11</td>
<td>11%</td>
<td>Updating teachers’ educational contents, changing teachers’ educational contents in line with this approach, modifying the Teacher Education course.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modification of Teacher Education practices</td>
<td>10</td>
<td>10%</td>
<td>Teacher Education courses (pre-service, in-service) should be such that they educate teachers in all aspects of (teaching to live).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modification of assessment methods</td>
<td>8</td>
<td>8%</td>
<td>Teachers’ self-assessment, or assessment by their colleagues.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of appropriate behavioral patterns</td>
<td>6</td>
<td>6%</td>
<td>Teachers who want to teach students to be should develop behavioral patterns appropriate to their lives and way of learning to be.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinforcement of the teachers’ professional commitment</td>
<td>5</td>
<td>5%</td>
<td>Commitment to the education of students in all physical, mental, and emotional aspects, educate learners with all knowledge, attitudes and skills required for learning to be approach.</td>
<td></td>
</tr>
<tr>
<td>Changes in educational-instructional methods (26%)</td>
<td>Dialogue-based education</td>
<td>8</td>
<td>8%</td>
<td>The dialogue-based education to attract students’ attentions to participate in learning to be skills.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experience-based learning</td>
<td>7</td>
<td>7%</td>
<td>Entering a teachers’ lived-experience or using their own experiences in the classroom to establish a close relationship between what the students learn in the classroom and the real world in which they live.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changes the structure of assignments</td>
<td>6</td>
<td>6%</td>
<td>A shift in assignment that only reinforces one dimension, for example, the knowledge domain, into a learning design that enhances the attitudes and skills necessary for students’ learning to be.</td>
<td></td>
</tr>
</tbody>
</table>

Sequel to Table 8 see on the next page.
Sequel to Table 8.

<table>
<thead>
<tr>
<th>Practical solutions for realizing learning to be approach</th>
<th>Changes in assessment methods</th>
<th>5</th>
<th>5%</th>
<th>The students conduct self-evaluation in order to gain self-awareness, reinforce their own positive thinking, self-direction, enhance their positive thoughts, and eliminate their deficiencies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration of effective staff (24%)</td>
<td>Family</td>
<td>8</td>
<td>8%</td>
<td>Getting help and experiences from families in educating their children.</td>
</tr>
<tr>
<td>Collaboration of the applied directorate</td>
<td></td>
<td>8</td>
<td>8%</td>
<td>All applied agents including principals; the teachers; the consultants; etc., should be responsible for their efforts to educate the perfect and grown learners.</td>
</tr>
<tr>
<td>Improvement of facilities and equipment</td>
<td></td>
<td>8</td>
<td>8%</td>
<td>Improving all elements and dimensions such as curriculum content of schools, educational spaces, facilities and equipment, culture and economics, and supportive education policies.</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Changes in Educational-Training Methods

Teachers must be trained in such a way as to attract students to the learning process and increase their participation in learning. Therefore, dialogue-based methods, i.e. using teachers’ own experiences and those of their students in life skills training, are very effective. Modifying the assignment structure: Designing assignments that can take advantage of the knowledge gained to serve themselves and human beings is vital. Student-based assessment methods are also helpful in this regard. Students should be convinced to assess their own activities and skills. This has led to an increase in students’ self-awareness and the consequently increase in self-esteem, self-confidence, self-belief, the formation of positive self-concept, and attainment to self-actualization.

Collaboration of Effective Components and Elements

Learning to be and being educated to be are shaped through families before entering school. Thus, the necessary training should be offered to families to educate their children regarding how to be. Children should learn that they are students only for 6 to 7 hours of a day; therefore, they live the rest of their time with their families. Other factors affecting education such as teachers, principals, applied staff, and school counselors should be justified with regard to the issue that the aim of the educational system is not just school education, but they should focus also on other forms of education such as learning to be a citizen, basic skills for life, customs and communication, skills of making relationships, other personal skills for personality development. This aim can be achieved through teamwork of the applied team. Furthermore, the necessary applied platforms and facilities for this learning approach should be provided, and the necessary educational spaces and the curricula content should be structured and regulated in such a way as to teach students how to live. The culture supporting education and effective economic and political factors should be identified and implemented in line with the learning to be approach among students.

Discussion and Conclusion

To achieve lasting development in the 21st century, we need new ways of thinking, diverse educational methods, new educational approaches, and a different perspective on science and culture. The only appropriate training is to create and secure a safe and secure world, and along with the vast scientific, industrial and social advances, encourage international cooperation to achieve sustainable global development. UNESCO’s third pillar of learning is learning to be in accordance with the view of humanism in education which aims at developing learners of all dimensions for a fertile, fruitful, and productive life. The fundamental and sustainable development of any society depend on the transformation of the education system of that society, and the main focus of the development in the education system is to improve the quality of the work of teachers as well as their knowledge and characteristics. Teachers are the founders of the scientific ideas of the “Missionaries of Values and Responsibilities” for the students and are the first ones in the training of human resources. The present study aimed at determining teacher professional competencies in the learning to be approach. The findings obtained from two qualitative and quantitative sections of the present study showed that the teachers of 21st century should educate students in a way that they can learn how to be in today’s
world and to take on life and the challenges they face. In addition, they should be aware of many educational issues including goals, methods of education and assessment, students, educational resources, and educational technology. Teachers should also be skilled in the implementation of teaching methods appropriate for this learning to be approach such as active teaching methods and the pivotal process leading to self-esteem, self-awareness, and self-confidence in students. They should play their facilitating role in pedagogy as well as possible and teach students about their realities and real issues. They should be able to provide students with objective and tangible problems of their lives and provide them with experience. Teachers need to know in what circumstances they live in global developments and are associated with them, the ability to use modern technologies and technologies, and how to work with them. They have the power of initiative, creativity, and skill and limit their activities to a few books or pamphlets with which they are familiar at teacher training centers or during their career because today’s complicated and advancing world requires constant learning, being flexible to developments, activity, sensitivity, and creativity. According to Albert Einstein, human beings should not be regarded as immortal instruments, but the youth should be delivered to the society as balanced figures. Many of the characteristics which 21st century learners are expected to have for living in the present century, in the first place, teachers, in the first place, should themselves have because teachers are personally a model for their students, and their behaviors, personality, and their functions are reflected in student learning. As a result, teachers themselves should have characteristics such as: being lifelong learner, researcher, fancier, creative and innovative, committed, flexible, compassionate and participatory, self-evaluative, ethical, and motivated. Issues raised as competencies for teachers in this learning approach were categorized in terms of teacher recognition, teaching and management skills, academic competencies, attitudes, skills, behavior, and general competencies. The results of the present study are consistent with many studies. The knowledge required by teachers as competencies are classified according to the results of the present study by Schulman (1986), Rosie (1999), Mishra and Koehler (2006), Huntly (2008), UNESCO (2008), Handrik et al. (2017), Koster et al. (2005). Competencies related to teacher training and management skills are consistent with Huntly’s (2008) professional practice, Hong’s (2008) management skills, Kosters’ et al. (2005) organizational competence, and Makarevics (2008) forms of professional activity. teacher personal characteristics in the studies of Handrik et al. (2017) titled as personal and social teacher competencies, Huntly (2008) as professional commitment, Hong et al. (2008), Koster et al. (2005) as behavioral competencies, Zhu and Wang (2014) as learning and social competencies as well as love of learning, Selvi (2010) as socio-cultural competencies, emotional competencies, lifelong learning, and Makarevics (2008) as communication competencies. Each of the categories includes the components of teacher personal competencies, which are presented under the categories of the present research as teacher competencies.

Some of the revealed ideas regarding teacher personal characteristics in this research have not been reported in previous studies. Those ideas provide insights and new questions about the teacher professional competencies in the learning to be approach. For example, the ability to guide students towards determining valuable goals of life is one of the issues that matter in learning to be as a competence for teachers; teachers need to transfer knowledge, skills, and attitudes about living and how to be to students. They should introduce the valuable goals of life and encourage and guide them to achieve the goals.
In addition, teachers’ ability to teach their students moderation and proportionality in life affairs; teachers should teach students in such a way that they learn that living is superior to every things, learn to live in unpredictable situations and conditions such as war, crisis, etc., learn that living is their priority and not focus on one dimension or aspect of life, but be humans who grow in all aspects of life.

The most important solutions suggested in this study for implementing this approach are training methods, and system participation. Therefore, UNESCO’s guidelines should be developed to train teachers in the context of learning to be approached in teacher training courses. The teaching methods should emphasize the central axis, experiential, axial, student-centered, pivotal process. In order for students to learn to be, all components and elements of the education system are recommended to work together to achieve this goal, and families, education staff, curriculum, and facilities need to be involved in it.

Acknowledgment

We are obliged to thank all the curriculum specialists who participated in interviews, and the teachers in Isfahan who patiently responded to the questionnaire.

References


for America, and Teacher Effectiveness.” *Education Policy Analysis Archives*, 13(42), 1–51.


Author’s name (2011). *Development Scholars who are competent and caring educators, committed to the spirit of service and learning. Conceptual framework*, Department of education, teacher education program.


Learning to Be: Teachers’ Competences and Practical Solutions...


UNESCO (2002). *Education for Sustainability from Rio to Johannesburg: Lessons Learnt from a Decade of Commitment*.


Correspondence concerning this paper should be addressed to Professor Seyed Ebrahim Mirshah Jafari, University of Isfahan, Faculty of Education and Psychology, Department of Education, Azadi Square, Zip code: 8174673441 Isfahan, Iran. Email: jafari@edu.ui.ac.ir
Appendix

A Questionnaire on the Teacher Professional Competences in the Learning to Be Approach

UNESCO titled the 21st Century the “Learning and Competences Century”, and qualified education is on the agenda for all countries. The International Commission on Education for the 21st Century suggests that relying on the four pillars of education forming the basis for education will enable all communities to go to a Utopia, in which all talents which are like the treasures hidden in the human nature, be used as properly as possible. These four pillars are: 1. Learning to know; 2. Learning to do; 3. Learning to be; and 4. Learning to live together. Accordingly, a research is to explain the UNESCO’s proposed approaches, to determine the teacher professional competencies, and provide a solution for their realization. The present questionnaire submitted to you is designed for collection of some of the data for a research. Given that you are a prominent and experienced teacher expert at education, your answers have a significant effect on the results of the research. Therefore, I would be obliged I you give a detailed opinion on each of the items listed below.

<table>
<thead>
<tr>
<th>Row</th>
<th>In your opinion, to what extent teachers should enjoy the following competences for realizing the learning to be approach?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to increase students’ individual skills such as self-awareness, self-esteem, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Ability to develop students’ self-esteem and self-esteem</td>
</tr>
<tr>
<td>3</td>
<td>Ability to guide students to determine their valuable goals for their lives</td>
</tr>
<tr>
<td>4</td>
<td>Ability to provide timely feedbacks on the students’ strengths and weaknesses</td>
</tr>
<tr>
<td>5</td>
<td>Knowledge of learning theories and their use in life skills training</td>
</tr>
<tr>
<td>47</td>
<td>Ability to discover students’ talents and lead them to flourish and nurture them</td>
</tr>
<tr>
<td>6</td>
<td>Ability to transfer beliefs and attitudes to students as useful and efficient people in the society</td>
</tr>
<tr>
<td>7</td>
<td>Ability to train students in all physical, cognitive, emotional and moral aspects</td>
</tr>
<tr>
<td>8</td>
<td>Ability to teach balance and fitness in all dimensions and affairs of life</td>
</tr>
<tr>
<td>9</td>
<td>Ability to teach life skills such as: flexibility, coping with emotions, coping with stress, etc.</td>
</tr>
<tr>
<td>10</td>
<td>Ability to develop life skills such as: creative thinking, critical thinking, cultural and social awareness, etc.</td>
</tr>
<tr>
<td>11</td>
<td>Attentions to different students’ emotions and feeling</td>
</tr>
<tr>
<td>12</td>
<td>Ability to teach adaptation and compatibility to environmental changes</td>
</tr>
<tr>
<td>13</td>
<td>Skills in teaching management and leadership methods in personal and professional life</td>
</tr>
</tbody>
</table>
Knowledge, Attitudes and Practices of Sustainability:
Systematic Review 1990–2016

Walter Alfredo Salas-Zapata, Leonardo Alberto Ríos-Osorio,
and Jaiberth Antonio Cardona-Arias
University of Antioquia, Medellín, Colombia

Abstract
For any transition towards sustainability to be successful, it is necessary to understand the knowledge, attitudes and practices (KAP) – related to sustainability – in different populations. A systematic review was conducted to identify and analyse KAP studies on sustainability that were reported in the scientific literature during the period of 1990–2016. Ten studies were found, of which half were conducted among populations in educational environments, i.e., teachers, students and graduates. The KAP results vary among the studies; however, there is a general tendency to investigate aspects related to ecosystems, natural resources, environmental protection and conservation. The present study concludes that it is necessary to conduct KAP studies that include categories that reflect on the wide range of meanings of sustainability and the attitudes and practices that would arise from such perspectives. This finding also reveals dimensions of sustainability usually omitted by KAP studies of sustainability.

Keywords: sustainability, education for sustainable development, environmental behaviour, knowledge, attitudes, practices, behaviours

Introduction
Transition towards sustainability is the change that human groups make to establish harmonious relationships with the natural systems that support them. This transition requires profound and radical changes in their beliefs and values, patterns of social behaviour, management regimes and multilevel governance in certain societies (Westley et al., 2011). Thus, to understand and/or promote the transition in a particular group of people, it would be necessary to examine at least three aspects: knowledge or beliefs, value systems and actions that, hypothetically, should be consistent with such belief and valuation schemes.

However, one aspect that makes such a transition complex to understand is the polysemy of the concept of sustainability. This concept has as many confusing and diverse meanings as the disciplinary areas and political contexts in which it is used (Balaceanu & Apostol, 2014; Besong & Holland, 2015; Bolis, Morioka, & Sznelwar, 2014; Ciegis,
Ramañauskiene, & Martinkus, 2009; Glavic, 2007; Mebratu, 1998). It is logical to assume that the imagined and heterogeneous perceptions of sustainability lead to modes of action that are equally heterogeneous. In a systematic review of scientific production related to sustainability issues, Salas-Zapata et al. (2017) revealed that researchers did not tend to define the concept of sustainability explicitly and that, among those who defined it, there were at least three different ways of understanding it: the first was a teleological understanding that assumed sustainability as a vision; the second was an ontological understanding that assumed sustainability as the behaviour of specific systems; and the third was an approach that involved the incorporation of environmental criteria into human activities. That study also revealed that the researchers did not use methodologies consistent with such conceptions of sustainability, which would support the hypothesis that diverse conceptions of sustainability were reflected in heterogeneous actions.

In this regard, the studies related to knowledge, attitudes and/or practices (KAP) provide a research typology, which is relevant to the initial approach to sustainability perspectives that prevail in different populations, as a basis to explore the potential sources of the success or failure of initiatives that promote sustainability.

The KAP model relates cognitive, affective and behavioural elements that are subject to intervention from communicative actions that increase the level of knowledge, change attitudes and improve practices. Knowledge refers to cognitive elements associated with mental actions such as perception, memory, learning and prediction during the processing of information. Attitudes are affective responses to an object, which depend on beliefs, values (Bohner & Wanke, 2002), personal experiences, encounters with others (Kerin, Hartley, & Rudelius, 2009), the processes of socialisation and, in general, direct or indirect contact with reality (Donahue & Miller, 2006). Practices denote specific actions that are directly related to processes that are cognitive (knowledge) and affective (attitudes) to the extent that all human acts are consistent with their values, beliefs, understanding, culture and other socialisation processes (Heimlich & Ardoin, 2008).

Despite the relevance of KAP studies, references to sustainability research with this sort of typology are scarce, and although there are a few records of positive attitudes towards sustainability education among students and teachers, this group is characterised by a low level of knowledge (Burmeister & Eilks, 2013), a low adhesion to sustainability practices among university students (de Castro & Jabbour, 2013), little understanding and awareness among students of what sustainability is (Green, 2013) and negligible improvements in the knowledge and awareness required to create a more sustainable society among students taking courses that incorporate sustainable development issues (Lozano & Young, 2013).

These records demonstrate the existence of a small number of studies that evaluate the three domains of the KAP model, as well as the absence of reviews that systematise the studies available on this topic. Ultimately, under a scenario of environmental concern such as the present one, which demands transitioning towards sustainability, a study must be able to synthesise the knowledge of sustainability and its different perspectives, the types of populations who share these perspectives, the most relevant attitude types and the categories of human action through which these perspectives produce such visions of sustainability, as well as the geographical and temporal profile of the studies.
The present study was designed with the objective of identifying and analysing KAP studies on sustainability reported in the scientific literature during the period of 1990–2016. These types of studies have such advantages as gathering, evaluating and synthesising multiple studies, reducing biases, identifying trends or sources of heterogeneity in the results and presenting greater external validity or possibilities for extrapolating the results (Cardona-Arias, Higuita-Gutierrez, & Ríos-Osorio, 2015).

In particular, a systematic review of KAP studies on sustainability is a valuable research alternative because 1) it can correct problems such as the semantic heterogeneity inherent in the concept of sustainability through the integration of plural and divergent views of the concept in different groups of people; 2) it permits the KAP of sustainability to be analysed in different areas such as energy, transport, agriculture and water management, as well as the unification of conceptual criteria between these sectors to understand the innovations and transitions that certain groups of people make to solve environmental problems; and 3) it could be a valuable tool for examining barriers of individual behaviour that may be determinants of the success of economic, social, political and technological decisions aimed at achieving more sustainable regions and societies.

Methodology

Type of Study

A systematic review of the scientific literature. Protocol for the search and selection of studies according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) publishing recommendations.

Search and Identification of Studies

Four search strategies were used, namely knowledge attitude practice AND sustainable development; knowledge attitude practice AND sustainability; KAP AND sustainable development; and KAP AND sustainability.

Search was performed in multidisciplinary databases: MEDLINE/PubMed, ScienceDirect, SciELO and JSTOR. A manual search was also performed in Google Scholar to improve comprehensiveness of the search. Some of the syntax employed were as follows: (knowledge attitude practice[Title/Abstract]) AND sustainability[Title/Abstract]; ((knowledge[Title/Abstract] AND attitude[Title/Abstract] AND practice[Title/Abstract])) AND sustainable development[Title/Abstract]; TITLE-ABSTR-KEY(knowledge AND attitude AND practice) and TITLE-ABSTR-KEY(sustainable development); (ti:KAP OR tb:KAP OR ab:KAP) AND ab:(sustainable development); and (ti:(ab:((KAP) AND (sustainability)))).

Screening

The studies identified were screened by applying three inclusion criteria: 1) the search terms had to be included in the title/abstract; 2) the studies had to be original; and 3) the primary objective of the research was to describe or analyse KAP as related to sustainability. The removal of duplicate studies was performed at the end of this stage. References of the screened articles were reviewed; it was ensured that the search did not have any temporal restriction of a retrospective manner, and the inclusion of
studies published up to 31 August 2016 was done prospectively. It is worth noting that in this review the study period was limited to 1990–2016, as studies prior to this period were not found.

**Selection**

The excluded studies comprised the studies in which the KAP model was used to assess the impact and/or sustainability of programmes, projects and other inventions, articles which only assessed the effect of a single category of KAP or when KAP was a secondary outcome of an intervention, and studies that did not make the results explicit for each of the KAP domains.

**Evaluation of Repeatability and Quality of Studies**

The search and selection protocol was applied independently by two researchers to ensure the reproducibility of the selection of studies; it was determined *a priori* that the differences would be resolved by consensus, in the same manner in which the extraction of information occurred. Evaluation of the quality of studies was based solely on the criterion of internal validity, which was determined by evaluating potential risks of selection and information bias, and in cases that required an assessment of potential variables of confusion. It is worth noting that external validity was not evaluated given that a majority of studies were performed in samples by convenience.

**Data Collection**

The variables of the study were title, authors, country, year, type and size of the population, measuring tools and results, and measurement tools for the domains of knowledge, attitudes and practices, for which extraction was completed independently by two investigators using a Microsoft Excel spreadsheet.

**Data Analysis**

A qualitative synthesis of the studies was performed for each of the variables described.

**Results**

The initial search identified 40,295 studies, which were limited to 159 by including the search terms in the title or abstract, followed by the application of the inclusion and exclusion criteria, which further systematised the results to 10 studies (Fig. 1). The studies were developed primarily in Asia (n=4) and Africa (n=3); only one study was from Europe, and two were from America. Only two studies were developed prior to 2006. The populations predominantly included teachers (n=1,190) and students (n=641), with a total of 2,853 individuals; two studies were qualitative and investigated KAP using interviews, and the remaining eight were quantitative studies based on surveys (Table 1).
In general terms, the objectives referred to in the different studies indicate two trends. The first trend involves the internalist studies, which intend to demonstrate the impact of proposed student training or the training and work that the trainees perform in the classroom during the teaching process, that is, the learning associated with the transmission of knowledge about sustainability-related issues. The other trend involves the externalist studies, which intend to demonstrate the impact on KAP that communities, public and private institutions, and civil society organisations have regarding issues related to sustainability (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Location</th>
<th>Objective</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mansaray et al.</td>
<td>1998</td>
<td>Nigeria</td>
<td>Determine the prevailing knowledge and attitudes of Nigerian secondary school teachers regarding salient environmental concepts and environmental education</td>
<td>360 art and science teachers^a</td>
</tr>
<tr>
<td>Mlipha and Manyatsi</td>
<td>2005</td>
<td>Swaziland</td>
<td>Investigate and establish basic environmental KAP of secondary and high school teachers in Swaziland</td>
<td>685 secondary teachers^a</td>
</tr>
<tr>
<td>Hai et al.</td>
<td>2010</td>
<td>Vietnam</td>
<td>Study the factors that influence the understanding of the concept, as well as the content indicators of sustainable development for health and environmental aspects</td>
<td>546 residents^a</td>
</tr>
</tbody>
</table>

Sequel to Table 1 see on the next page.
In the eight quantitative studies, tools primarily consisted of surveys with Likert type questions and scores ranging from 0–100, with greater than 50 being considered a good result and greater than 80 being excellent. Only two studies made the results explicit according to the reliability scale analysis, with a Cronbach α of greater than 0.70 (Awang et al. 2013 and Da Silva 2015).

Table 2 summarises the KAP profile reported in each study, highlighting the following findings: *i*) studies with teachers had a high level of heterogeneity, as some reported a low level of knowledge, with negative attitudes and low participation in environmental protection practices (Mansaray, Ajiboye, & Audu, 1998), whereas in others, the KAP was highly satisfactory (Da Silva, 2015; Mlipha & Manyatsi, 2005); *ii*) something similar occurred in the research with students, who exhibited poor knowledge but excellent attitudes and practices (Kioko & Kiringe, 2010), as well as in studies with unsatisfactory results in the practice domain (Wan Nur‘ashiqin, Er, Ali, Lyndon, & Hashim, 2011); and *iii*) the study with adults conducted by Cardwell (2011) reported favourable knowledge, attitudes of scepticism and an excellent level of practice, whereas in younger people, Awang (2013) reported moderate to good levels in their KAP.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Location</th>
<th>Methodology</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kioko and Kiringe</td>
<td>2010</td>
<td>Kenya</td>
<td>Investigate the role of environmental and wildlife clubs, as well as formal education in environmental and wildlife conservation, in Maasailand in southern Kenya by comparing youth with different levels of schooling and by comparing formally and informally educated youth.</td>
<td>160 secondary and 290 primary students&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cardwell</td>
<td>2011</td>
<td>Canada</td>
<td>Understand how the Canadian public currently perceive and behave with regards to global environmental change.</td>
<td>22 adults from the general population&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Wan Nur‘ashiqin et al.</td>
<td>2011</td>
<td>Malaysia</td>
<td>Diagnose the domains of KAP among the University Kebangsaan Malaysia (UKM) Bangi campus community.</td>
<td>191 students and 45 staff&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Awang et al.</td>
<td>2013</td>
<td>Malaysia</td>
<td>Examine and discuss the levels of knowledge, attitudes and recycling practice among young civil servants at their workplaces.</td>
<td>244 young people 20–40 years old</td>
</tr>
<tr>
<td>Johar and Razak</td>
<td>2014</td>
<td>Malaysia</td>
<td>Describe the environmental consciousness among communities in a developing country.</td>
<td>140 homeowners&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Da Silva</td>
<td>2015</td>
<td>Guyana</td>
<td>Examine the perceptions, level of awareness and knowledge of teachers and their ability to foster skills and infuse information about the conservation of mangroves into their teaching.</td>
<td>100 teachers&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fernández-Manzanal et al.</td>
<td>2015</td>
<td>Spain</td>
<td>Clarify whether a university education contributes to developing future professionals that help society become more sustainable.</td>
<td>70 graduates&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> Survey, <sup>b</sup> In-depth interviews
### Table 2

**Description of KAP of the Included Studies**

<table>
<thead>
<tr>
<th>Author</th>
<th>Knowledge</th>
<th>Attitudes</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mansaray et al. (1998)</td>
<td>Teachers with a low level of knowledge, especially in the arts group</td>
<td>Negative attitudes towards the environment in all three groups</td>
<td>Have never worked with environmental education issues</td>
</tr>
<tr>
<td>Mlipha and Manyatsi (2005)</td>
<td>Teachers with a high level of knowledge about the environment</td>
<td>High frequency of positive attitudes</td>
<td>Participation in tree planting and litter removal</td>
</tr>
<tr>
<td>Hai et al. (2010)</td>
<td>Low level of knowledge about environmental protection and health</td>
<td>Low inclination to participate in programmes</td>
<td>Low participation in environmental and health activities</td>
</tr>
<tr>
<td>Kioko and Kiringe (2010)</td>
<td>Students with little knowledge of the importance of conservation</td>
<td>Excellent attitude towards conservation</td>
<td>High participation in conservation activities</td>
</tr>
<tr>
<td>Cardwell (2011)</td>
<td>Adults with high local environmental awareness and low global awareness</td>
<td>Scepticism over causes and impacts of some initiatives</td>
<td>High participation in recycling and energy consumption reduction</td>
</tr>
<tr>
<td>Wan Nur’ashiqaq et al. (2011)</td>
<td>Teachers and students that understand the concept of a sustainable campus and whose knowledge differs from that of the administrative staff</td>
<td>Teachers and students consider it important to implement sustainable campus initiatives in university programmes and to adopt sustainable lifestyles</td>
<td>Reduction, recycling and reuse is only practised by the staff; a preference for using private transportation exists in both groups</td>
</tr>
<tr>
<td>Awang et al. (2013)</td>
<td>Young people with good knowledge regarding recycling</td>
<td>Positive approach to recycling</td>
<td>A moderate level of recycling at work</td>
</tr>
<tr>
<td>Johar and Razak (2015)</td>
<td>Low scores in general</td>
<td>Low scores</td>
<td>Low scores</td>
</tr>
<tr>
<td>Da Silva (2015)</td>
<td>Teachers with good knowledge of mangroves and their conservation</td>
<td>Positive attitude</td>
<td>Incorporation of these themes into their teaching</td>
</tr>
<tr>
<td>Fernández-Manzanal et al. (2015)</td>
<td>Participants were aware of such themes as environmental management, preservation of natural spaces and environmental impact assessment; they also understood hurdles to environmental actions</td>
<td>Low willingness to participate and propose projects and strategies, waiting until others take the initiative (procrastination) on environmental actions</td>
<td>Few graduates participate in environmental activities</td>
</tr>
</tbody>
</table>

The tools used in all studies were organised into a list, synthesised and then classified by emerging categories in each of the three domains (Appendix 1). A total of fourteen categories were identified, six within the domain ‘knowledge’, five within the domain ‘attitudes’ and three within the domain ‘practices’ (Table 3).
Table 3
Categories Identified in Each Domain in the Included Studies

<table>
<thead>
<tr>
<th>Domain</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Knowledge of environmental problems</td>
</tr>
<tr>
<td></td>
<td>Knowledge of a particular ecosystem</td>
</tr>
<tr>
<td></td>
<td>Ecological knowledge of their region</td>
</tr>
<tr>
<td></td>
<td>Knowledge of concepts</td>
</tr>
<tr>
<td></td>
<td>Knowledge of behaviours or actions that promote sustainability</td>
</tr>
<tr>
<td></td>
<td>Perceptions of incentives and restrictions for performing actions that</td>
</tr>
<tr>
<td></td>
<td>promote sustainability</td>
</tr>
<tr>
<td>Attitudes</td>
<td>Motivations and reasons that drive environmentally friendly behaviours</td>
</tr>
<tr>
<td></td>
<td>Valuation (importance) attributed to certain actions</td>
</tr>
<tr>
<td></td>
<td>Satisfaction with themselves and others</td>
</tr>
<tr>
<td></td>
<td>Readiness to take action</td>
</tr>
<tr>
<td></td>
<td>Feelings and concerns that environmental problems generate</td>
</tr>
<tr>
<td>Practices</td>
<td>Individual actions</td>
</tr>
<tr>
<td></td>
<td>Actions linked to the actions of others</td>
</tr>
<tr>
<td></td>
<td>Actions of other people or organisations</td>
</tr>
</tbody>
</table>

Discussion

The concept of sustainability has diverse and sometimes contradictory meanings, which depend on the contexts the term is used. This variety of applications and meanings often leads to a lack of clarity that hinders its operationalization (Mebratu, 1998; Glavic, 2007; Ciegis et al., 2009; Balaceanu and Apostol, 2014; Bolis et al., 2014). In part, this ambiguity is due to sustainability being a complex phenomenon which can be simultaneously assumed as a set of goals and purposes of human organisations, the behaviour of certain systems — the capacity of social-ecological systems to last in time — and the incorporation of environmental, social and economic variables, or criteria, into certain activities (Salas et al., 2017).

In such a sense, when exploring knowledge, attitudes and practices related to sustainability it is reasonable to find heterogeneity. According to these findings, participants’ knowledge on sustainability is heterogeneous and has an environmental character. In some cases, participants show an elevated knowledge level, while in others, a low one. In both settings, such knowledge seems to have an environmental character. Regarding attitudes, participants have positive attitudes towards sustainability, but their willingness to participate in projects or programmes related does not necessarily point at the same direction. Results on practices are equally divergent.

Knowledge on Sustainability

Knowledge, as described by the studies, enables the identification of the participants’ tendency to understand sustainability as an environmental issue related to ecosystems or natural resources. Consequently, knowledge of sustainability, as reported in the studies, is related to specific ecosystems or resources, their care, protection and preservation, or environmental problems. It follows that low or unsatisfactory scores in this domain
indicate that the participants in these studies had little knowledge of certain ecosystems, environmental problems or environmentally friendly practices. This type of knowledge is, in turn, reflected in the six categories described in Table 3.

The present study is in contrast with the ways of understanding sustainability that have been reported in the scientific literature. For example, one of the studies assumes sustainability is a synonym for sustainable development and therefore has a political or humanitarian meaning (Salas-Zapata et al., 2017). This view of sustainability was not explored by the KAP studies, and, consequently, it is not possible to determine whether the participants consider intergenerational equity to be a component of sustainability. This may possibly explain why these studies used tools that had an environmental orientation.

Sustainability can also be understood as balance, equilibrium and society’s ability to reorganise natural systems after disturbances (Salas-Zapata et al., 2017). This manner of understanding sustainability was also unclear in the examined KAP studies. As in the previous example, this result may be due to the fact that the items or variables used were not aimed at exploring this way of understanding sustainability, but it should also be noted that theoretical developments in the concept of sustainability are still incipient. As a result, the selection or construction of tools by researchers may be a reflection of these developments.

Sustainability can also be understood as the incorporation of environmental criteria into human activities (Salas-Zapata et al., 2017). Apparently, this was the perspective used in the KAP studies insofar as the questions were directed in such a way as to understand what the participants knew about their surroundings, its problems, ecosystems and environmental actions.

Half of the studies reviewed were conducted with students and teachers or graduates. In other words, half of these studies are associated with education. In this regard, it should be noted that the synthesis of results has revealed findings that are consistent with KAP studies conducted in the field of sustainability education. For example, the study conducted by Burmeister and Eilks (2013), which included students and teachers, revealed that the participants’ knowledge on sustainability was limited and had poor theoretical support. Similarly, the study conducted by Green, which included North American university students, demonstrated that despite being provided with content regarding sustainability and the environment from a regulatory or legal perspective in an introductory economics course, this mechanism failed to improve the students’ understanding and apprehension towards issues of sustainability and the environment (Green, 2013).

Another aspect that was not immediately apparent in the selected studies is the exploration of barriers to knowledge. This finding contrasts with the results of several KAP studies in the field of sustainability education in which researchers examined aspects related to the learning of specific knowledge. Kataria et al. (2013) described some perceptions of employers about the most effective methods for incorporating topics or initiatives related to sustainability. For the chemical engineering students in the Aziz study group, it was evident that problem-based learning produced or developed knowledge and significant behavioural changes towards sustainable development (Aziz, Yusof, Udin, & Yatim, 2013), and Lankester (2013) suggested the presence of knowledge limitations in learning about sustainability, which affected changes in perspectives and related practices.
Attitudes Related to Sustainability

The studies analysed demonstrate that, in general, participants have a positive attitude towards sustainability, but their willingness to actively participate accordingly does not necessarily correspond to this attitude. This means that participants tend to value important environmental issues such as the conservation and protection of the environment and ecosystems, practices such as recycling and the existence of sustainability programmes and projects; however, this positive valuation does not appear to translate into a willingness to be involved with programmes or projects and is even less influential in regard to pursuing environmental initiatives.

Burmeister and Eilks (2013) demonstrated that students and teachers reported positive attitudes towards education on the topic of sustainability. The results from Burns (2013) indicated that teachers had a greater awareness of the importance and need to incorporate sustainability into higher education. For their part, Du et al. (2013), in their Chinese population based study, alluded to the fact that sustainability, particularly its incorporation in curricula, increasingly acquired greater importance in higher education. Similarly, Delong and McDermott (2013), who evaluated the attitude of administrators towards the incorporation of sustainability principles into programmes related to marketing and undergraduate education, confirmed the need and relevance of incorporating sustainability into marketing and business courses.

As in the case of knowledge, the attitudes explored by KAP studies have an environmental orientation. The analysis of variables related to attitudes was broken down into five categories; all of them were related to the environment. Consequently, other attitudes that might also be related to sustainability such as motivation, importance, satisfaction and disposition towards solidarity, social responsibility and equity were ignored. These are attitudes, which are not related to society–nature interactions and may also affect the transition towards sustainability.

Practices Related to Sustainability

The studies reviewed reported practices related to sustainability such as recycling, the incorporation of environmental issues and environmentally-friendly activities such as those that reduce energy consumption, tree planting and the use of public transport. The results that included the participation of people in these activities are, however, divergent.

The practices described in the studies are consistent with the attitudes found in them. Mansaray et al. (1998), Hai et al. (2010), Johar and Razak (2015) and Fernández-Manzanal et al. (2015) reported low scores in sustainability practices and/or low participation in environmental activities, as well as found negative attitudes or a low disposition and willingness to participate. Kioko and Kiringe (2010), Mlipha and Manyatsi (2005) and Da Silva (2015) found positive attitudes, or high scores, for sustainability practices such as a high participation in environmental activities, including the incorporation of sustainability and tree planting.

However, attitudes are not the only factor related to behaviours and practices. There are elements in the individuals’ environment that affect these practices that are not necessarily explored in the KAP studies. Redman (2013) demonstrated that although a group of young people received sustainability education, this did not contribute to the
adoption of sustainable behaviours; this result appeared to be related to the cultural and social environment of the participants. Similarly, Lozano indicated that the awareness of changes – towards sustainability – by a group of students might be related to the high number of students per course (Lozano & Young, 2013). In this regard, other studies pointed out that environmental behaviours, e.g., recycling, might be influenced by factors of the immediate environment of the participants that transcended the individual sphere like family background and household infrastructure (Kolbe, 2015). It should be noted that one of the limitations of the KAP studies is that they only address the individual sphere of the participants.

As for knowledge and attitudes, the practices investigated in these studies also have an environmental orientation and ignore the social aspects of sustainability. This implies that practices of cooperation, altruism and reciprocity, which are necessary for the sustainable management of certain ecosystems (Ostrom, 2011), deserve to be studied; paradoxically, however, the tools used by the KAP studies do not allow this aspect to be analysed.

**Challenges of Education for Sustainable Development**

Among other objectives, Education for Sustainable Development (EDS) aims “[at reorienting] education and learning so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development” (UNESCO, 2014, p. 14). This systematic review brought to light two aspects that seem to be problematic for Education for Sustainable Development: the complexity of sustainability and of human behaviour inconsistency.

Among the limitations of this study is the high degree of heterogeneity of the categories and tools used to evaluate the KAP of sustainability, which prevented the implementation of a meta-analysis for the scores of each domain. Another aspect that limits the scope of the findings of this study is the environmentalist bias presented by the selected studies. The implied trend in the selected studies, to assume sustainability as being ‘environmental’, led automatically to circumscribing not only knowledge but also attitudes and practices to this field, which inevitably resulted in omitting aspects that might be more important for promoting the transition towards sustainability such as adaptive capacity, creativity to solve environmental problems and cooperation to resolve conflicts.

This heterogeneity of categories may have its origin in the complexity of the phenomenon of sustainability. Since sustainability can mean, at the same time, a purpose, a dynamic behaviour and a set of social-ecological criteria (Salas-Zapata et al., 2017), the variety of items in knowledge is not necessarily coherent with the items in attitudes and practices. This lack of coherence among items of the studies reviewed makes it difficult for findings to be synthesised and for hypotheses on the kind of knowledge and attitudes worth exploring to be formulated; particularly at any time a project aims at modifying practices of certain human groups.

From the same perspective, ESD faces the problem of human behaviour inconsistency. Consistency can be defined as the degree to which knowledge and attitudes are transferable to practices (Suarez, 2008). Understanding the factors that influence consistency between knowledge, attitudes and practices is necessary for educational processes,
since it would allow practitioners to design strategies adjusted accordingly so that education develops into behavioural outcomes. However, the heterogeneity of categories used in KAP studies would prevent practitioners from considering those factors and using scientific evidence to support teaching-learning processes aimed at improving environmental behaviours.

From this perspective, future research on the study of knowledge, practices and attitudes on sustainability in different sectors requires a reconstruction of the categories that comprise each domain in such a way that the tools used permit a global understanding of the actions and visions that can enhance or impede the transition towards sustainability.

Conclusion

Studies on knowledge, attitudes and practices related to sustainability tend to assume sustainability as being the environmental character of something. Thus, the KAP studies analysed in this systematic review focused on exploring environmental knowledge (on ecosystems, natural resources and environmentally-friendly practices). With regards to attitudes, these studies also explored environmental positions by inquiring about the importance and value that people place on environmental issues and practices. A similar finding is observed in the practices described by these studies, as they are associated with environmentally-friendly practices such as recycling, the incorporation of environmental themes and energy conservation.

The studies analysed did not explore other perspectives towards sustainability, such as intergenerational equity, when sustainability is assumed as sustainable development, or adaptability of the relationship between humans and ecosystems. Apparently, for the same reason, they did not inquire about attitudes and practices concerning the relationship between human beings that is also necessary to ensure sustainability. Attitudes such as a concern for the distribution of benefits and externalisation of the costs of human activities, responsible behaviour towards others and cooperation to resolve collective problems were not a focus of interest in these studies. This finding suggests a need to conduct KAP studies that address the perspectives of sustainability that were ignored in the KAP studies reviewed.

References


Cardwell, F. (2011). *Knowledge, attitudes and practices of global environment change and health: Toward sustainable behavior change?*. (Master), McMaster University, Hamilton.


Correspondence concerning this paper should be addressed to Associate Professor Walter Salas-Zapata, Calle 70 No. 52 – 21, Ciudad Universitaria, Oficina 5-103, Zip Code: Apartado Aéreo 1226, Medellín, Colombia. Email: walter.salas@udea.edu.co

Appendix 1

Construct of KAP on Sustainability in Studies Reviewed

<table>
<thead>
<tr>
<th>Field</th>
<th>Category</th>
<th>Item</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of environmental problems</td>
<td></td>
<td>What changes related to the global change have you perceived in your health?</td>
<td>Cardwell (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Which environmental factors affect health at a community level?</td>
<td>Cardwell (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What does climate change (global warming) mean to you?</td>
<td>Cardwell (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Which are the main problems in mangrove areas?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>Knowledge of certain ecosystem</td>
<td></td>
<td>Can I identify different mangrove types and species?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do I need help to identify mangrove species?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What are the ecological functions of mangroves?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Would the disappearance of mangroves be damaging for Guyana?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>Ecological knowledge of their</td>
<td></td>
<td>Are there different types of mangrove in Guyana?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>region</td>
<td></td>
<td>Is it possible to find mangroves in every administrative district in Guyana?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>Knowledge of concepts</td>
<td></td>
<td>Do I understand the concept of sustainable campus?</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is the university campus sustainable?</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
</tr>
</tbody>
</table>

Sequel to Appendix 1 see on the next page.
Do you understand the difference between the terms *global change, climate change* and *global warming*? Cardwell (2011)

Where do you obtain information about environmental issues? Cardwell (2011)

What is health? Cardwell (2011)

There was an assessment of the environmental knowledge about natural resources. Johar and Razak (2015)

<table>
<thead>
<tr>
<th>Knowledge of behaviors or actions benefiting sustainability</th>
<th>I know about the Guyana Mangrove Restoration Project and its actions.</th>
<th>Da Silva (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I know programs, projects and/or organizations working on environmental issues in my community.</td>
<td>Cardwell (2011)</td>
</tr>
<tr>
<td>Are you aware of any environmental action in the university?</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
<td></td>
</tr>
<tr>
<td>Is your center or company managed in accordance to sustainable principles?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
<tr>
<td>Can recycling practices reduce climate change?</td>
<td>Awang et al. (2013)</td>
<td></td>
</tr>
<tr>
<td>Does recycling save energy?</td>
<td>Awang et al. (2013)</td>
<td></td>
</tr>
<tr>
<td>Knows how to separate waste according to container color.</td>
<td>Awang et al. (2013)</td>
<td></td>
</tr>
<tr>
<td>The low carbon development strategies can reduce the impact of climate change.</td>
<td>Da Silva (2015)</td>
<td></td>
</tr>
<tr>
<td>Nothing can be done with recycled things.</td>
<td>Awang et al. (2013)</td>
<td></td>
</tr>
<tr>
<td>What can you do to carry out environmentally friendly actions?</td>
<td>Cardwell (2011)</td>
<td></td>
</tr>
<tr>
<td>What difficulties have you had to make part of pro-environmental strategies?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
<tr>
<td>Does the merit and demerit system promote sustainability culture in the university?</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
<td></td>
</tr>
<tr>
<td>What are the obstacles to making behavior changes (towards environmentally-friendly behaviors)?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
</tbody>
</table>

**Perceptions of incentives and restrictions that may affect behaviors or actions benefiting sustainability**

<table>
<thead>
<tr>
<th>Motivation and reasons behind environmentally friendly behavior</th>
<th>What is the reason behind people’s friendly – or not – behavior towards the environment?</th>
<th>Cardwell (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Would you like know more about mangroves?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td></td>
<td>Would I be interested in learning more about climate change and development strategies?</td>
<td>Da Silva (2015)</td>
</tr>
</tbody>
</table>

**Importance or relevance given to certain actions**

| The conservation of mangroves will gain importance over time. | Da Silva (2015) |
| Perceived value of tourism, currency exchange, wildlife containment, recreation, employment, | Kioko and Kiringe (2010) |

*Sequel to Appendix 1.*
### ATTITUDES

<table>
<thead>
<tr>
<th>Question</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it important to introduce a sustainable campus program in the university?</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
</tr>
<tr>
<td>Has sufficient effort been made in the conservation and management of mangroves in Guyana?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>Should wildlife be preserved?</td>
<td>Kioko and Kiringe (2010)</td>
</tr>
<tr>
<td>Is the information about mangroves and its management adequate and available?</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>Recycling practices are good/bad.</td>
<td>Awang et al. (2013)</td>
</tr>
<tr>
<td>Recycling is practical/a little practical.</td>
<td>Awang et al. (2013)</td>
</tr>
<tr>
<td>Has the environmental training that you received been useful professionally?</td>
<td>Fernández-Manzanal et al. (2015)</td>
</tr>
<tr>
<td>I am willing to include aspects related with mangroves in the syllabus and study programs.</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>I am prepared to maintain a sustainable lifestyle.</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
</tr>
<tr>
<td>Do you carry out actions different to those regularly expected as part of your organization operations?</td>
<td>Fernández-Manzanal et al. (2015)</td>
</tr>
<tr>
<td>Concern about the climate change.</td>
<td>Cardwell (2011)</td>
</tr>
</tbody>
</table>

### PRACTICES

<table>
<thead>
<tr>
<th>Question</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you: turn off the lights and the faucets; recycle frequently; walk or use the public transport; replace aerosols; avoid using plastic; eat organic food; plant trees; use fluorescent bulbs?</td>
<td>Johar and Razak (2015)</td>
</tr>
<tr>
<td>I usually discuss aspects related with mangroves with my students.</td>
<td>Da Silva (2015)</td>
</tr>
<tr>
<td>I prefer to use public transport instead of the one offered by the university.</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
</tr>
</tbody>
</table>

Sequel to Appendix 1 see on the next page.
<table>
<thead>
<tr>
<th>Actions related to those of others</th>
<th>Participation in training programs.</th>
<th>Johar and Razak (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you participated in conservation activities at home?</td>
<td>Kioko and Kiringe (2010)</td>
<td></td>
</tr>
<tr>
<td>Have you attended workshops and lectures about mangroves conservation?</td>
<td>Da Silva (2015)</td>
<td></td>
</tr>
<tr>
<td>Have you made part of environmental strategies and projects?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions of other persons or organizations</th>
<th>Has the Mangroves Restoration Project informed the schools about the mangroves in Guyana?</th>
<th>Da Silva (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you been trained in environmental matters at work or in your organization?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
<tr>
<td>My family always reminds me about not contaminating the environment.</td>
<td>Awang et al. (2013)</td>
<td></td>
</tr>
<tr>
<td>Did you receive specific training in environmental matters while in college/university?</td>
<td>Fernández-Manzanal et al. (2015)</td>
<td></td>
</tr>
<tr>
<td>People at campus show sustainable behaviors.</td>
<td>Wan Nur’ashiqin et al. (2011)</td>
<td></td>
</tr>
<tr>
<td>Has the Mangroves Restoration Project provided training in hygiene and health?</td>
<td>Da Silva (2015)</td>
<td></td>
</tr>
</tbody>
</table>
Implementing Education for Sustainable Development in Namibia: School Teachers’ Perceptions and Teaching Practices

Eveline O. Anyolo
University of Namibia, Windhoek, Namibia

Sirpa Kärkkäinen and Tuula Keinonen
University of Eastern Finland, Joensuu, Finland

Abstract

Education for Sustainable Development (ESD) has been viewed as education that helps people develop the attitude, skills, and knowledge to make well-informed decisions for the benefit of the present and future generations. It aims at providing quality education through shared understanding and multi-disciplinary approaches in meeting the developmental and environmental apprehension for a sustainable future. Many theorists envisaged ESD as enhancing active involvement of learners both in school and out of school learning initiatives to acquire knowledge about sustainable development issues. The present paper discusses Namibian school teachers’ (n=9) perceptions of ESD and the teachers’ teaching practices using a qualitative-explorative study design. The data were gathered through two semi-structured interviews and lesson observations. The findings have revealed that senior secondary school teachers perceive ESD in terms of knowledge acquisition about the environment in order to use its resources sustainably for the benefit of future generations. The study has also revealed that teachers have positive sentiment toward the inclusion of ESD into the senior secondary school curriculum. Following this, they suggested that ESD should be either implemented as an independent subject or integrated with other existing subjects as a multi-disciplinary subject.

Keywords: education for sustainable development, implementation of education for sustainable development, teachers’ perceptions, secondary school

Introduction

Education for Sustainable Development (ESD) is concerned with equipping individuals, communities, and governments to live and act sustainably and understand environmental, social, and economic aspects of sustainable development (Reid, 2002). It focuses on improving the quality of the environment, quality of life, and a more equitable economic growth for sustainability. A sustainable society requires healthy, well-educated, skilled,
Implementing Education for Sustainable Development in Namibia...

and active citizens that are informed and motivated to live more sustainably and ensure future generations’ quality of life (e.g., Biasutti, De Baz, & Alshawa, 2016; Carban & Fisher, 2017). Therefore, both affective and cognitive aspects of learning should be incorporated in ESD (Littledyke, 2008). Sustainability can be seen as a goal for ESD akin to Sustainability Education (SE), which is used synonymously in the present study.

The goal of ESD is to educate and train students for sustainable decision-making in the future through social learning, a special form of transformative learning (Wals, 2011). Teachers have the responsibility to help learners develop and address the knowledge and skills needed to enable them to understand complex sustainable development issues, and sustainability challenges facing society (Hungerford, 2010). Successful learning in ESD is closely related to methods used by the teachers and learners (Abdulwali, Alshmrani, & Almufti, 2017; Kostova & Atasoy, 2008; Olsson, Gericke, & Chang Rundgren, 2016; Ortega & Fuentes, 2015; van Gejeka, 2013). However, many teachers feel under-prepared as they lack knowledge in ESD (Summers, Childs, & Corney, 2005; Uitto & Saloranta, 2017). The present study examines Namibian school teachers’ perceptions of ESD and how they implement ESD in teaching. In Namibia, ESD is becoming more important because of the growing economy and the number of relatively young consumers who need to learn to live sustainably. In Namibia as well as in many other African countries, educational policies, standards in education and practices in educational institutes are varying (see Egne, 2014; Ololube, Egbezor, & Kpolovie, 2008).

Teachers’ perceptions of ESD play a major role in the way they teach and prepare learners for the future. The presence of sustainability and ESD in the curriculum varies around the world and the implementation of ESD in schools and universities has been studied in several countries from different continents (e.g., Biasutti et al., 2016; Egne, 2014; Fraser, Gupta, & Krasny, 2015; Green & Somerville, 2015; Kimaryo, 2011; Olsson et al., 2016; Sund, 2016; Uitto & Saloranta, 2017). North American practitioners from formal and informal institutions represented different distinct perspectives in prioritizing environmental education outcomes (Fraser et al., 2015). Green and Somerville (2015) found that Australian primary school teacher’s accounts of their practice illustrate the ways they interacted with the materiality of local places as an essential part of sustainable education. They identified ESD practices within the four sets of relations: the materiality of school grounds; connections with local places; partnerships with community; and creative processes. A study carried out in Tanzania reveals that primary school teachers perceive environmental education as providing knowledge about the environment (Kimaryo, 2011). In Sweden, Olsson et al. (2016) compared different schools in relation to ESD and found differences in the effects on students’ sustainability consciousness, a concept that integrates the environmental, social, and economic dimensions of sustainable development all including knowingness, attitudes and behaviour. Swedish teachers also articulated different ways of utilising the curriculum and enacting pedagogies relating to complex global issues (Sund, 2016). Contextual-historical aspects of global sustainability issues were primarily emphasised by the civics and history teachers; these teachers as well as the science teachers related to the affective aspect by considering equity, fairness and responsibility to distant others as important factors with sustainability issues (Sund, 2016). Uitto and Saloranta (2017) pointed out that subject teachers’ awareness of their ESD competence was important in implementing discipline-based and interdisciplinary ESD in their teaching. In their study, every subject teacher group had its specific strengths and weakness in ESD. For instance, teachers of biology, geography,
history and social studies and, to some extent, also religion and ethics teachers considered several but different sustainability dimensions and used holistic approaches in their sustainability-related teaching (Uitto & Saloranta, 2017).

Holistic approach is also highlighted by Yavetz, Goldman, and Pe’er (2014). According to the scholars, teachers need to enrich their learners’ knowledge about the environment and abilities to understand, criticise and participate rationally in the discourse or controversial, value-laden issues of sustainability, which require a holistic approach. Wals (2011) points out that social learning is learning by mirroring one’s own ideas, views, values, and perspectives with those of different from others. Using a multi-disciplinary approach, Borg, Gericke, Höglund, and Bergman (2014) found that teachers have an understanding of the concept as a whole, i.e., they know what they are supposed to contribute in their own teaching. However, teachers have difficulties in terms of understanding the complexity of sustainable development issues, the nature and the interrelations of its sub-concepts (Corney, 2006). Teachers have also little understanding of the term “sustainability”, in terms of its content and principles. As a result, they somewhat take into consideration most of the local and national issues and seem to underestimate the global ones (Spiropoulou, Antonakaki, Kontaxaki, & Bouras, 2007). In addition, Green and Somerville (2015) reported that teachers did not understand the concept and could not integrate sustainability into an already overcrowded curriculum. To engage teachers in integrating sustainability into the curriculum, they need to be active curriculum planners themselves. Furthermore, active curriculum planners need to be equipped with adequate professional knowledge and personal practical knowledge (Kabadyi, 2016).

ESD learning methods are as follows:

1) Interdisciplinary and holistic;
2) Learner-centred and participatory;
3) Value-driven, promoting critical thinking and exploring all stakeholders;
4) Forward-looking, promoting medium and long-term planning;
5) Locally relevant, encouraging multilateral collaboration among schools, local actors, and authorities, scientific communities, private sector, and NGOs, etc. and revealing global issues and connections as part of everyday life, whether in a small village or a large city (Alampei, Malotidi, Psallidas, & Scoullos, 2013, p.110).

The participatory active teaching methods stimulate learners to reflect on their own learning regarding sustainability (Scott, 2008). Integration of emotional approaches is particularly relevant for fostering reflective awareness at a number of levels (self-awareness, social awareness and environmental awareness). Thus, reasons and emotions can be integrated with socially or ecologically beneficial behaviour at the individual, societal and political levels (Littledyke, 2008). Participatory methods such as problem-solving, discussions, debates, presentations, fieldwork, experiments, demonstrations, projects and co-operative learning (Huckle, 2006; Ketlhoilwe, 2007; 2010; Sterling, 2001) promote competencies such as critical thinking, imagining future scenarios and making decisions in a collaborative way (Scoullos, 2013; UNESCO, 2009). For many ESD (school) programmes, fieldwork is singled out as an important approach (Corney & Reid, 2007; Gayford, 2003; Jeronen, Palmberg, & Yli-Panula, 2017). Jeronen et al. (2017) emphasise especially the value of inductive teaching methods with student-centred approaches in authentic environments with first-hand experiences and field trips, including
problem-based activities, as factors increasing students’ interest and knowledge of sustainable development. Fieldwork appeared to have positive effects also on students’ attitudes and behavior concerning sustainability (Jeronen et al., 2017). If learners are not actively involved in the environment as part of their learning, they will never be enthusiastic to the environment (Majumdar, 2012).

There seems to be a number of barriers that teachers experience in successful implementation of ESD in schools. These are a lack of time (Corney, 2006; Dube, 2012; Hartsell, 2006; Iliško, Ignatjeva, & Mičule, 2011; Kanyimba, 2002; Simasiku, 2012; Summers et al., 2005); a lack of teachers’ knowledge and skills and resources (Spork, 1992; Summers et al., 2005); and a lack of awareness and involvement in sustainable development (Velazquez, Munguia, & Sanchez, 2005). Additionally, a lack of teaching and learning materials is among the challenges faced by the teachers in implementing ESD (Summers et al., 2005). Further, Kanyimba (2002) found resistance to change and deficiency in environmental policies as barriers that negatively affected the effective implementation of ESD. Other barriers include teachers’ personality, the prevailing school climate regarding the use of teaching methods and a lack of support from the school principals (Summers et al., 2005). Many teachers are willing to develop their teaching and work in an interdisciplinary way, but they feel that they do not have time and knowledge, skills, and resources (Spork, 1992; Summers et al., 2005). In addition, educational policies, which highlight closed and subject-centred discourse, could make successful teaching about sustainable development even more problematic in the future (Dimenäs & Alexandersson, 2012).

The ESD approach has been integrated as a cross-curricular theme in Namibian schools (Ministry of Basic Education, Sport and Culture, 1997). In 2002, the National Assessment Report testified that Namibia faced challenges in integrating ESD activities in the national programmes to ensure a sustainable future. Most teachers in Namibia are used to the traditional teaching and learning methods that take learners as passive listeners in the classrooms; thus, they resist to the change to learner-centred approach to teaching (Kasanda et al., 2005). However, teachers in Namibia as well as school managers have a partial understanding of ESD (Kanyimba, 2002). The present study produces deeper knowledge about Namibian teachers’ ways to implement ESD. The following research questions have been put forward to guide the study:

- How do teachers perceive education for sustainable development?
- How do teachers perceive the integration of education for sustainable development into the school curriculum?
- What teaching strategies do teachers use in implementing education for sustainable development?
- What barriers do teachers face in implementing education for sustainable development?

**Methodology**

The present study is framed as qualitative research because it aims at understanding the subjective world of the human experiences (Cohen, Manion, & Morrison, 2011) and seeks answers to questions that stress how social experience is created and the meaning that it is given (Denzin & Lincoln, 2008). Thus, a qualitative approach is seen
as a type of a research approach that focuses on description, interpretation and exploration of ESD and its integration into the curriculum. The use of a qualitative approach in the present study helps the researchers hear the voices and understand the feelings of teachers about the implementation of ESD in the school curriculum, as well as identify actions teachers have taken to make sure that ESD is fostered into practice. This indicates that the researchers are interested in the process, meaning and understanding gained through interacting with teachers, in order to enable the researchers to gather descriptive data.

The qualitative research follows a case study design, an empirical inquiry that investigates a contemporary phenomenon, implementation of ESD, within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and which uses multiple sources of evidence (Yin, 2003; 2009) and provides an opportunity for one aspect of a problem to be studied in some depth (Bell, 2010).

Participants and Setting

Nine senior secondary school teachers (5 male and 4 females) from three schools in Oshana Education region were chosen through purposeful sampling for a specific purpose. The aim of purposeful sampling is to generate a sample that allows for an understanding of the social process of interest (Nigatu, 2009). The teaching experience of the sample of teachers ranges from 2 to 25 years. Five of the participants obtained a Bachelor of Education Degree (BEd) after Grade12 and four obtained a Teaching Diploma (Table 1). For a convenient reference back to the data sources; schools were allocated codes. For ethical consideration, teachers were given pseudo names.

<table>
<thead>
<tr>
<th>School</th>
<th>Teacher (Pseudo)</th>
<th>Gender</th>
<th>Qualification</th>
<th>Subject</th>
<th>Teaching experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Desy</td>
<td>Male</td>
<td>Post Graduate in Education</td>
<td>Business studies</td>
<td>13 years</td>
</tr>
<tr>
<td></td>
<td>Lily</td>
<td>Female</td>
<td>BEd Honours in Education</td>
<td>English</td>
<td>14 years</td>
</tr>
<tr>
<td></td>
<td>Moris</td>
<td>Male</td>
<td>BEd Honours in Education</td>
<td>Biology and Mathematics</td>
<td>5 years</td>
</tr>
<tr>
<td></td>
<td>Penni</td>
<td>Female</td>
<td>Diploma in Education</td>
<td>Biology</td>
<td>2 years</td>
</tr>
<tr>
<td></td>
<td>Pea</td>
<td>Female</td>
<td>BEd. Honours in Education</td>
<td>Development Studies</td>
<td>25 years</td>
</tr>
<tr>
<td>S2</td>
<td>Oli</td>
<td>Male</td>
<td>Advanced Diploma in Education</td>
<td>Biology and Physical Science</td>
<td>5 years</td>
</tr>
<tr>
<td></td>
<td>Don</td>
<td>Male</td>
<td>BEd Honours in Education</td>
<td>Development Studies</td>
<td>3 years</td>
</tr>
<tr>
<td></td>
<td>Pius</td>
<td>Female</td>
<td>Higher Education Diploma</td>
<td>Agriculture</td>
<td>13 years</td>
</tr>
<tr>
<td>S3</td>
<td>Radon</td>
<td>Male</td>
<td>Bachelor of Education</td>
<td>Geography and Development Studies</td>
<td>8 years</td>
</tr>
</tbody>
</table>

The selection of schools was based on a number of criteria. Firstly, all schools are senior secondary schools. Secondly, all chosen schools are state-run schools, no private schools were chosen because some of them followed different curricula. Thirdly, the schools were chosen based on subjects or fields of studies offered. Fourthly, the locations
of the schools were also considered. School One and school Two are located in town and cater for urban learners. School Three is located in the suburb and caters for both rural and urban learners.

Data Collection and Analysis

To answer the research questions of the study, two data collection methods (semi-structured interviews and lesson observations) have been used. The choice of the methods has been influenced by the research aims and objectives.

Semi-structured Interviews

According to Willis (2007), qualitative interpretive case studies tend to use semi-structured interviews and unstructured interviews, which can be conducted one-to-one or in groups. Semi-structured interviews are used to find out information from a particular group of people, or to find out their opinions (Mweti & Van Wyk, 2005). Besides, they offer rich and more extensive data than data from surveys or even the open-ended portions of survey instruments (Yin, 2012). Accordingly, a semi-structured interview well serve the purpose of the study. More importantly, the open-ended questions used in the semi-structured interviews could allow the interviewees to provide answers at length, and the researcher to probe further.

Observations

According to Burton, Brundrett and Jones (2008, p. 97), observation is one of the most powerful tools in research, especially for researchers in social sciences. The purpose of observation is mainly to give the researcher direct, first-hand experience with the phenomena under study (Cantrell, 1993). Accordingly, the participants were also observed to see whether they put into practice what they said they intended to do in the interviews. Afterwards, teachers were asked to reflect on their lessons regarding integrating the aspects of sustainable development (ecological, social and economic) into their teaching. Finally, they briefly commented on their reflections.

Data Analysis

This study adopted a qualitative content analysis to analyse data from interviews and lesson observations. According to Flick (2007), content analysis is one of the procedures for analysing textual (verbal or behavioural data) materials. It involves a process designed to condense raw data into categories or themes based on inference and interpretation (Zhang & Wildemuth, 2009). The responses from interviews were coded by making use of the Atlas-ti programme. Data from observations were manually coded. The codes were grouped into different categories and subsequently developed into themes by making use of an inductive data analysis.
Results and Discussions

Teachers’ perceptions of ESD were categorised in five themes: concept of ESD, integration of ESD into the curriculum, teaching practices in implementing ESD into the curriculum, barriers to the effective implementation of ESD, and suggestions for improving the implementation of ESD at senior secondary schools.

Education for Sustainable Development

All the nine teachers had similar understanding of sustainable development as they supposed that sustainable development was about using the resources in a sustainable way in order to benefit generations to come (cf., Spiropoulou et al., 2007). However, in their explanations, teachers did not show how sustainable development was linked to social and economic dimensions of sustainable development. Five teachers (Desy, Pea, Don, Pius and Radon) described ESD as making people aware of the environment. Lily, Moris, and Penni related ESD to caring for the environment in terms of sustaining its resources to ensure a sustainable future. Oli described ESD as education that promoted critical thinking and problem-solving skills. These types of teachers’ perceptions are presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Categories</th>
<th>Teachers</th>
<th>Teachers’ examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESD as environmental awareness and sustaining resources</td>
<td>Desy, Pea, Don, Pius, Radon</td>
<td>ESD is just to extend the environmental awareness so that our learners can at least know more about the environment. Actually, this is just to do with the awareness, to open the learners mind so that they know more about their environment and that they have to sustain the natural resources (Pius).</td>
</tr>
<tr>
<td>ESD as education for sustainable future</td>
<td>Lily, Moris, Penni</td>
<td>ESD simply means just to educate people so that they are able to wisely use what has been there so that it can be used by future generations (Penni).</td>
</tr>
<tr>
<td>ESD as skills-focus education</td>
<td>Oli</td>
<td>ESD, I think is the kind of education that encourage or promote critical-thinking and problem-solving skills, being able to think about the development in a way that you do not have any negative impact on the environment. For example, if one wants to develop a country, the result will be pollution, because industries will release a lot of smoke into the air. So, ESD will like teach people how to think critically about these issues so that they do not create problems (Oli).</td>
</tr>
</tbody>
</table>

Apart from creating environmental awareness, Don and Pius stated that ESD taught about social and economic aspects and acknowledged that all aspects were important for sustainable development. In this way, they enriched their learners with more than knowledge to enable them to participate rationally in the discourse, value-laden issues of sustainability which required a holistic view in addressing social, cultural and ethical aspects (Scoullos, 2013; Wals, 2011; Yavetz et al., 2014). Affective aspects highlighted by Littledyke (2008) can be seen included in these aspects.
Implementing Education for Sustainable Development in Namibia.

ESD was also described in relation to a sustainable future by Lily, Moris and Penni. Since teachers perceived sustainable development as taking care of the resources for future generations, they also described ESD in relation to the equitable distribution of resources for the benefit of future generations Reid (2002). Teachers did not identify local places, communities or creativity as part of ESD (c.f., Green & Somerville, 2015). Skills for maintaining life for future generations were demonstrated in Oli’s perceptions of ESD as he described it in terms of critical thinking and problem-solving skill development Alempe et al. (2013). Oli is the only biology and physical science teacher; thus, there were some differences in teachers’ perspectives according to their teaching subjects (Sund, 2016; Uitto & Saloranta, 2017). However, the differences were not clear, the schools were similar, none was specialised in ESD, and no clear differences were found Olsson et al. (2016). Teachers particularly linked ESD to knowledge through resources (Kimaryo, 2011). It can be concluded that they were three slightly different perspectives on ESD: environmental awareness, sustainable future and skill-focused perspectives (Table 2, cf., Fraser et al., 2015).

Integration of ESD into the Curriculum

Teachers’ perceptions of the integration of ESD into the curriculum are categorised in three categories and are shown in Table 3.

Table 3
Teachers’ Perceptions of the Integration of ESD into the Curriculum

<table>
<thead>
<tr>
<th>Categories</th>
<th>Teachers</th>
<th>Some teachers’ examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching ESD topics in different subjects</td>
<td>All</td>
<td>Yes, in biology and physical science, we got a topic called conservation which is the last topic in the syllabus. It deals with how to conserve water; animals and species like endanger species (Penni).</td>
</tr>
<tr>
<td>Integrating ESD within the existing subjects</td>
<td>Desy, Lily, Moris, Penni, Pea Don</td>
<td>It is better that ESD is taught across the curriculum. Offering ESD on its own may overload the curriculum and the timetable. So infusing it into other subjects will be safe to the curriculum and the schools especially the timetable. Teaching and learning materials such as books may also be needed (Moris).</td>
</tr>
<tr>
<td>Integrating ESD as an independent subject</td>
<td>Oli, Don, Pius, Radon</td>
<td>I think it will be more beneficial if it (ESD) is a subject on its own because it will be given enough teaching time. Now, teachers are just sort of browse through these topics and they are not given the kind of attention they deserve (Oli).</td>
</tr>
</tbody>
</table>

All teachers acknowledged the teaching of topics that led to sustainability in their subject. Such topics include, among others, sustainable development, environmental issues, nature conservation, tourism, social justice, and gender issues. To some extent, they were aware what they were supposed to contribute to their own teaching (Borg et al., 2014). However, the complexity of sustainable development issues might not have been understood (Corney, 2006; Spiropoulou et al., 2007). Desy, Lily, Moris, Don, and Pea were positive about the integration of ESD within the existing subjects (cf., Green & Somerville, 2015). They feared that if ESD was offered as a separate subject, there
would be too many subjects in the curriculum. Therefore, in order to avoid overloading the timetable, they felt that ESD should be integrated into the existing subjects (Borg et al., 2014; Uitto & Saloranta, 2017). Oli, Don, Pius and Radon suggested that ESD should be taught as an independent subject. They argued that in this way ESD could be taught effectively, and that a fair assessment was given to it.

Most teachers felt that infusing ESD into the existing subjects saved time on the timetable and did not need a new teacher as well as teaching resources. They also sensed that the framework would ensure that the curriculum remained unchanged. They argued that having ESD as a subject on its own could overload the curriculum and the timetable, the concern about the need for new teachers and teaching and learning materials was in line with Kimaryo (2011). To summarise, ESD within existing subjects and ESD as an independent subject were jointly acknowledged.

### Teachers’ Teaching Practices in Implementing ESD into the Curriculum

Teachers’ interview responses were classified into three categories as teachers’ training in ESD, teachers’ teaching methods to ESD, and the involvement of learners in other activities to strengthen the importance of ESD in schools. The teachers’ interviews were followed by lesson observation to see how teachers integrate ESD into practice.

All teachers indicated that they did not attend any training on ESD: “No, I did not have any training” (Desy); “Not at all, I have to improvise on that one” (Oli). It is clear that teachers teach partly something that they are not knowledgeable and do not know how to teach it (cf., Borg et al., 2014). Thus, teachers were asked to describe how they became knowledgeable about ESD in the second interview. Desy, Lily, Penni, Pius and Oli said that they came to know about ESD issues from the syllabi of the subjects that they taught. “I learned ESD from interpreting the syllabus of the subject that I teach. Like the topic that I taught a week ago about meiosis, meiosis is a form of cell division and when the cell is dividing it is continuous hence it is sustainable” (Penni). Oli shared similar sentiment but added that he also learned about ESD through media. Oli stated, “Through the media, it is something that I watch on TV, came across it on the Internet, read it in the newspapers, heard it from conferences on SD and perhaps, not on ESD specifically. I got much connected when I began to teach the science subjects. Some of the topics especially the last topic in the syllabus touches on resources and how to utilise them wisely. That is how I became knowledgeable about ESD” (Oli). Radon was of the opinion that he learned more on ESD issues during the conference that he attended and also through studying geography as a major subject during his teacher training.

Although teachers did not attend any training, they were able to grasp ESD knowledge in various ways, which enabled them to integrate ESD into their teaching (cf., Borg et al., 2014; Corney, 2006; Green & Somerville, 2015; Spiropoulou et al., 2007). Desy, Lily, Penni, Pius and Oli gained their ESD understanding from interpreting their subjects’ syllabi. For Oli and Radon, the use of media and conference attendance contributed a lot to their ESD background.

From the teachers’ interview responses, it emerged that teachers used participatory methods to teach ESD (Table 4). Teachers’ participatory teaching methods are limited to discovery, fieldwork, brainstorming and discussion (cf., Huckle, 2006; Ketelhoilwe, 2007; 2010; Scoullos 2013; Sterling, 2001). The fieldwork method includes the use of school ground and community (Corney & Reid, 2007; Gayford, 2003; Jeronen et al.,
2017) in order to enable learners to interact with the environment and learn in real life. Teachers also reasoned that apart from what learners got in classrooms, they also needed to familiarise themselves with their school ground and environment. They believed that interacting with people and observing things within the local environment would ensure learners’ deep understanding of issues studied. None of the teachers made reference to the use of non-participatory methods in teaching ESD.

Table 4

<table>
<thead>
<tr>
<th>Methods (interview)</th>
<th>Teachers</th>
<th>Some teachers’ examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery</td>
<td>Pea, Moris</td>
<td>I send learners to go find information from newspapers because there is a lot of important information about the environment. I also want learners to learn by themselves and know that what they are studying is about current issues (Pea).</td>
</tr>
<tr>
<td>Fieldwork</td>
<td>Oli, Don, Penni</td>
<td>Mhh, that is a bit challenging because I am not really trained as such. But sometimes, I use field trips, not really going far from the school. It is a very good way of teaching environmental topics because learners learn more on things that they see and get first-hand experiences on whatever they are learning out there (Don).</td>
</tr>
<tr>
<td>Brainstorming</td>
<td>Lily</td>
<td>I ask learners to brainstorm environmental topics for discussion. I opt for this method because our Namibian education system is saying that we should focus on learner-centred education. We should not see our learners as empty vessels in class. The learner-centred education is the reason why I use this method (Lily).</td>
</tr>
<tr>
<td>Discussion</td>
<td>Desy, Radon, Pius</td>
<td>I let learners write essays about environmental issues such as drought, deforestation, desertification, the use of natural resources and how they can be sustained and discuss them in class. I want learners to be aware about the importance of the environment and their surroundings. (Pius).</td>
</tr>
</tbody>
</table>

Although teachers indicated that they used participatory methods in integrating ESD into their teaching, this was not evident from the lesson observations made. In actual teaching, teachers only used lecture, question and answer, demonstration and peer-presentation methods. Demonstration and peer-presentation methods were the least used methods.

It can be deduced that teachers did not use any of the methods that they said they used in the interviews during the actual teaching. Observation revealed that the lecture method was used by all teachers. All teachers, except Moris, also used questions and answers where questions were the main mode through which the content was discussed with learners. Demonstration method was used by two teachers (Lily and Oli) and peer presentation method was only used by one teacher (Oli).

Teachers described the methods they used as participatory methods. These methods are likely to enable learners to develop, express and justify their own views about sustainability and also help them make the link between school learning and daily life (Scoullos, 2013). Teachers indicated that to enable learners to learn in real-life and gain
first-hand experiences, they took their learners to field trips within their local environments or elsewhere (Corney & Reid, 2007; Jeronen et al., 2017; Ketloilwe, 2010; Kimaryo, 2011). They believed that the use of participatory methods such as brainstorming among others would enhance learners’ participation in class and generate lots of ideas from the learners as it invited learners to participate. The use of participatory methods was implemented by the learner-centred approach adopted by the Namibian education system. Teachers’ idea supported the view that learners came with wealth of knowledge that they gained over the years from interacting with the environment and with others, which could not be ignored (Ketloilwe, 2010).

**Barriers to the Effective Implementation of ESD**

Barriers faced by teachers include lack of learners’ motivation, time constraints, unavailability of teaching and learning materials, lack of teachers’ training and limited ESD content in some syllabi (Table 5).

<table>
<thead>
<tr>
<th>Teachers’ Teaching Methods from Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methods (Observation)</strong></td>
</tr>
<tr>
<td>Lecture</td>
</tr>
<tr>
<td>Question and answer</td>
</tr>
<tr>
<td>Demonstration</td>
</tr>
<tr>
<td>Peer presentation</td>
</tr>
</tbody>
</table>

Lack of learners’ motivation can also be a result of lack of awareness and interest in the environment on the side of the learners (Majumdar, 2012). The finding suggests that learners’ motivation is very crucial for their own learning and that it is important that learners are made aware of and actively involved in sustainability practices concerning environmental and developmental issues so as to boost their intrinsic motivation. Teachers were mostly concerned about the teaching time and the attention ESD topics were gaining from schools teachers. They felt that most of the topics required more time as learners needed to engage in practical activities and hand-on experiences. However, they sensed that the teaching time allocated to each subject was very limited and did not allow for these types of activities (Corney, 2006; Dube, 2012; Hartsell, 2006; Kanyimba, 2002; Simasiku 2012; Summers et al., 2005). Teachers also felt that the time was not enough for them to engage learners in participatory learning (cf., Dube, 2012; Majumdar, 2012).

Lack of teaching and learning materials was also identified as one of the barriers (cf., Iliško et al., 2011; Summers et al., 2005). Radon stated that a lack of materials in schools was attributed to the fact that there was a lack of fund in many schools. Radon
Implementing Education for Sustainable Development in Namibia...

and Penni felt that textbooks should be available for both teachers and learners. The results can be supported because to teachers, textbooks are the only readily and most important materials as they were developed in line with the syllabus. However, the use of textbooks as teaching and learning resources may hinder the effective implementation of ESD because using the textbook can be more teacher-centred. Lack of training was identified by teachers. They felt that they were not competent to teach ESD since they were never trained to do so (Borg et al., 2014; Corney, 2006; Kimaryo, 2011; Ortega & Fuentes, 2015; Uitto & Saloranta, 2017; Velasquez et al., 2005).

Table 6

<table>
<thead>
<tr>
<th>Categories</th>
<th>Teachers</th>
<th>Teachers’ examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of learners’ motivation</td>
<td>Oli, Don</td>
<td>To get learners interested about the idea of ESD is a challenge, because I do not think there is evidence that the environment is being damaged. To convince them that it is important to take care of the environment as the country is moving forward is a challenge. That is why I came up with the idea of debating on environmental issues just to get learners motivated and be enthusiastic about ESD (Oli).</td>
</tr>
<tr>
<td>Limited time allocation</td>
<td>Moris, Don, Pius</td>
<td>We have many objectives on these (EE) topics that require us to take learners for field trips. For us to go on field trips, we only get 3 days from the region. And for one to explain throughout while in the journey, it takes much time. So, this means that one has to drive straight to the planned site and omit to explain to learners things that are observed throughout the journey. So, time is limited (Moris).</td>
</tr>
<tr>
<td>Lack of teaching and learning materials</td>
<td>Pius, Radon</td>
<td>Ya, we do not have enough textbooks. We also have financial problems that sometimes in the clubs, we want to buy cameras and video machines to make use of them to record whatever we are doing (Radon).</td>
</tr>
<tr>
<td>Limited content/ Unclear syllabi</td>
<td>Lily</td>
<td>There are challenges in my perception especially when it comes to English as subject. There is no indication that you have to teach about these topics on ESD, unless it is only from the teacher where you have to use your creativity (Lily).</td>
</tr>
<tr>
<td>Lack of teachers’ training</td>
<td>Penni, Desy, Pea</td>
<td>To me integrating ESD is a challenge because I did not get any training so in the end I may have little information that will not be able to cater for the learners (Penni).</td>
</tr>
</tbody>
</table>

Teachers were also asked to describe other activities they involved their learners in order to promote ESD. Six of the teachers, Desy, Lily, Pea, Oli, Don, and Radon, said that they involved their learners in school cleaning campaigns. Desy, Moris, Pea, Don and Radon noted that their learners were involved in tree planting activities, while Don involved his learners in environmental auditing. All teachers acknowledged having involved their learners in activities other than those in the curriculum to promote sustainable practices in schools.
Differences in Teachers’ Perceptions on ESD

It emerged from the present study that the way teachers perceived ESD influenced their teaching practices. Figure 1 summarises the study findings on teachers’ perceptions of ESD and the teachers’ teaching practices and how they influence each other in the implementation of the school curriculum. It is illustrated that the teachers’ perceptions of ESD vary from teacher to teacher (Fraser et al., 2015; Olsson et al., 2016; Sund, 2016).

![Figure 1. Influences of teachers’ perceptions of ESD (interviews) into their teaching practices (observations)](image_url)

It can be said that nearly all teachers can be classified as those who perceive ESD as teaching about the fragility of the environment and its resources and its importance to the future generations. These teachers demonstrated a lack of understanding of the importance ESD places on developing people’s values and attitudes necessary for the development of a sustainable and caring use of the environment for their benefits and that of the future. This may result in a relatively narrow end product, typically involving the learning of specific knowledge and skills.

One teacher (Oli) can be classified as one who perceives ESD as a process of involving learners in taking actions towards the environment. This teacher is likely to take learners for excursions to enable them to have first-hand experiences, use problem solving, demonstration, presentation and decision-making methods. This may result in a broader end product where learners take responsibility for their own learning.

Conclusions

The present study has attempted to explore Namibian teachers’ perceptions of the implementation of ESD and the teachers’ teaching practices. The findings of the research may be of interest to school and university educators and should be considered when developing the ESD in Namibia and around the world. The results showed that teachers were familiar with the concept of sustainable development. They described ESD mainly in terms of creating environmental awareness to ensure the sustainable use of natural resources. Regarding the implementation of ESD, all teachers acknowledged the integ-
Implementing Education for Sustainable Development in Namibia.

The integration of ESD into their subjects and school curriculum to respond to the challenges of sustainability in order to improve the quality of the environment. Some teachers suggested that ESD should be taught as an independent subject so that it could be effectively implemented. They argued that this was the only way to ensure that sustainable development issues were dealt with in depth. Other teachers acknowledged and were positive about the integration of ESD into the existing subjects. There is a universal need for the knowledge-competent teacher with a holistic view who can handle multidisciplinary complexity of ESD (see, e.g., Dimenäs & Alexandersson, 2012).

A teacher, who sees ESD as education in which environmental values and attitudes are explored through direct interaction that promote active learning, is likely to use participatory active approaches to ensure learners’ involvement. These methods allow learners to take responsibility for their own learning and act morally and effectively in preserving the environment as they learn through hand-on experiences. These experiences enable reflection and the development of critical awareness and concern about the environment. In this way, the learners’ success may be broad: comprehending texts, learning how to learn, developing collaborative skills, and improving well-being. As a result, this allows for greater understanding that leads to the development of various skills to ensure enhancement of learning outcome.

Barriers such as a lack of learners’ motivation, time constrain, a lack of teaching and learning materials were identified by teachers. They believe that with these barriers they are unable to implement ESD successfully; hence, there is a need for ESD training. Such training will equip teachers with the necessary knowledge and skills that will help them understand the complexity of sustainable development issues and their interrelations (cf., Iliško et al., 2011).

Although the results of the study like other qualitative studies cannot be generalized beyond its context, it seems that the findings are contextually and socially important for African counties to manage the diversity of their economies and environmental problems in future. Technology is also playing a more important role in African education. Although there are many industrial challenges for African countries, for example, Nigerian teachers are dissatisfied with the absence of infrastructure and ICT equipment (Ololube et al., 2008).

Advisory teachers/subject advisors are the main source of teachers’ professional support in Namibia. Future studies should be conducted on advisory teachers to find out how they support and what kind of support they provide to teachers regarding the integration of ESD into the teaching of their subjects. The same study will also reveal how advisory teachers monitor the implementation of ESD in the school curriculum in comparison with teachers who were not trained to teach ESD. Student teachers should be made aware of sustainable development issues and aspects before they embark upon their teaching responsibility. It is therefore suggested that a study being conducted with UNAM the main teacher education institute in Namibia to find out how it ensures that these teachers are being trained and prepared to implement ESD in schools. The student teachers’ perceptions about their readiness of implementing ESD in schools will shed more light on how the teacher education curriculum can be reoriented to ensure student teachers are prepared enough to teach according to ESD approaches. Similar study can also be conducted with the primary and junior secondary teachers.

The present study has shown that even with availability of local resources it is not enough to prepare teachers to transfer their perceptions into practical activities. Thus,
there is a need for longitudinal studies and holistic curriculum development to further explore and overcome teachers’ internal and personal barriers and pedagogical knowledge.

References


Implementing Education for Sustainable Development in Namibia.


Correspondence concerning this paper should be addressed to Eveline Omagano Anyolo, University of Namibia, Hifikepunye Pohamba Campus, Ondangwa-Oshakati Main Road, Ongwediva, Namibia. Email: eanyolo@unam.na

Correspondence concerning this paper should be addressed to Sirpa Kärkkäinen and Tuula Keinonen, Yliopistokatu 7, 80100 Joensuu, Finland. Email: tuula.keinonen@uef.fi, sirpa.a.karkkainen@uef.fi
The Need for Entrepreneurial Education at University

Rita Vaicekauskaite
Klaipeda University, Klaipeda, Lithuania

Asta Valackiene
Kaunas University of Technology, Kaunas, Lithuania

Abstract
Entrepreneurship has been seen as a mystical phenomenon for many years. It has been a prevalent notion about success for talented and lucky people. The growing number of research confirms that education plays a significant role in fostering entrepreneurship and new attitudes to it. Recent measurements have mainly been oriented to education as fostering motivation for business-oriented entrepreneurship; moreover, growing attention is devoted to sustainability entrepreneurship. The article introduces the conceptual analysis of different education models and generated impact on entrepreneurial activities. The article also provides an interview-based research analysis about students and teachers’ early entrepreneurial intentions and activities. The present study confirms a significant need for entrepreneurial education in order to start, develop, and successfully realise innovative ideas.

Keywords: entrepreneurship, education, university

Introduction

For many years, education and scientific inquiry have been driven by the desire to discover the truth. The paradigm of innovation implied that scientists generated value in the process of their scientific research (Salité et al., 2016). Nowadays higher education has a complex task to enable knowledge to solve real problems with emergent economic effect. Evidence is rapidly growing that a great gap still existing between knowledge production and application might be successfully filled by entrepreneurship.

The meaning of entrepreneurship is narrowed to the ability to create a “business plan”, to establish an enterprise, or to start a business. However, broadly defined, entrepreneurship means the ability to create wealth; it also refers to the dynamic interaction between the individual and any opportunities in a given environment marked by a high degree of complexity and uncertainty (Neck, Greene, 2011; Dutta et al., 2011). Neck and colleagues (2018) note that entrepreneurship is surrounded by myths of risk taking, moment success and young people can get wrong attitude; therefore, it is important to study early experience of successful entrepreneurs.
Ries (2011, p. 28) notes that too often we overemphasise the significance of product (services) in entrepreneurship instead of thinking about people: “it is an acutely human enterprise”. On the other hand, Christensen (2000) talking about history of the disk drive industry states, “the disruptive innovations were technologically straightforward” (p. 23).

Many experts agree that our economic future to great extent depends on entrepreneurs. Due to both reasons of extended conceptualisation and importance for society, there is a great need to find out ways to foster entrepreneurship, and the particular role is given to university. Entrepreneurship is mainly related to business establishment outside university. Corporate entrepreneurship is a way when large organisations encourage entrepreneurial spirit (Neck et al., 2018). Mathews (2012) states that we need more than just “the innovation department”, we need a culture of innovation. Moreover, corporate entrepreneurship is gaining more meaningfulness when oriented to sustainability.

Entrepreneurship is becoming a meaningful building block of society eco-development. It reveals growing efforts in linking entrepreneurship and sustainability (Linden, 2018). According to Hall (2010), it is substantial awareness that entrepreneurship has a unique impact on a transition to more sustainable society; however, “there remain major gaps in our knowledge of whether and how this process will actually unfold” (ibid, p. 440). Therefore, it is raising importance for conceptualisation of entrepreneurship in the perspective of sustainability.

The article introduces conceptual analysis about different education models and generated impact on entrepreneurial activities. The article embodies interview-based research and descriptive analysis about students and teachers’ early entrepreneurial experiences when they had no special preparation before. Research methodology is based on naturalistic inquiry and social constructionism notion calling to move “from empiricism to constructionism” (Gergen, 2015, p. 62). Three separate group interview sessions were conducted with four university students, three university teachers, and four administration specialists who have been involved in entrepreneurial activities in recent five years. The interview is the most dominant research method in the field of entrepreneurship (Kraus, Meier, & Niemand, 2016). We claim, that university learning environment fosters entrepreneurial initiatives with motivation for new opportunities, however, the need for entrepreneurial education rise due to challenges of complex situation for perspective development. Furthermore, combining conceptualization and descriptive research data analysis we aim to find out how the need for education is related with particular education model.

**Review on Research Evidence: The Role of Education in Fostering Entrepreneurship**

Entrepreneurship is a discipline, and thus it can be both learnt and taught (Kassean et al., 2015; Ries, 2011). As Ries (2011, p. 49) notes “anybody who fails in a start-up can claim that he or she has learned a lot from the experience”. However, Cope (2011) remarks that the process of learning from failure is not clearly described and conceptualised. Laukkanen (2000) suggests differentiating between “educate entrepreneurship” and “teach entrepreneurship”. Teaching entrepreneurship encompasses the study, construction, and development of theories about entrepreneurship, whereas educating entrepreneurship focuses on the development of entrepreneurial skills and motivation. We lack consistent data how the entrepreneurial courses impact students’ willingness to
engage in an entrepreneurial activity; moreover, how they help become successful, and what kind of learning content and processes should be encompassed. Empirical data demonstrate existing links between entrepreneurial education programmes and students’ later involvement in entrepreneurial activities. Some results show that completion of one entrepreneurship course increases the likelihood of having entrepreneurial intention by 1.3 times (Dehghanpour Farashah, 2013). Entrepreneurship graduates are three times more likely to start their own business, three times more likely to be self-employed, have annual incomes 27 percent higher, own 62 percent more assets, and are more satisfied with their jobs (Charney & Libecap, 2000; cited in Kassean et al., 2015). Ronkko and Lepisto (2014) referring to previous research state that entrepreneurial behaviour can be learnt. However, some research states that entrepreneurial programme should be a complex to make a direct impact on entrepreneurship motivation (Farhangmehr, Gonçalves, & Sarmento, 2016). The knowledge of business management is an important but not sufficient factor for motivation to start entrepreneurship; competencies of communication in close relation with confidence are rather important.

The study performed by Karimi et al.’s (2016) emphasises the need to evaluate the complexity of entrepreneurship education which, on the one hand, strengthens students’ intentions for being entrepreneurs and, on the other hand, education makes people more conscious and self-critical. The study of self-efficacy carried out by Piperopoulos and Dimov (2015) shows that the type of the taught course is important for entrepreneurial intentions. The results show that the nature of the course moderates the relationship between students’ self-efficacy beliefs and entrepreneurial intentions; the relationship is negative in “theoretically oriented” and positive in “practically oriented” courses. Some research data have already demonstrated that students who engage in more entrepreneurship experiential learning activities report greater entrepreneur initiatives (Kassean, et al., 2015).

Overview of Coexisting Conceptualisations for Entrepreneurship Education

Entrepreneurial education is a significant part of a vast field dealing with innovative education. The main unifying element between innovative pedagogy and entrepreneurship is a “created value” (Maritz & Donovan, 2015). Innovative pedagogy is more focused on the process of creation; entrepreneurship is more oriented to commercialisation dealing with risk and uncertainty, and finally business establishment. It is considered that the mission of entrepreneurship is to fill a gap of commercialisation or discover new possibilities in the process of innovation (Maritz & Donovan, 2015). However, entrepreneurship itself is a very broad and vague field that lacks unified conceptualisation (Farhangmehr, Gonçalves, & Sarmento, 2016; Maritz & Donovan, 2015; Ronkko & Lepisto, 2014; Dehghanpour Farashah, 2013). Schumpeter introduced the idea of innovation, by describing entrepreneurs as innovators who drive changes in the economy by serving new markets or creating new ways of doing things. However, according to Drucker’s (2015) point of view, the core element of entrepreneurship is about discovering opportunities; therefore, entrepreneurship is not always linked to innovation.

Mathews (2012) draws our attention to transformative thinking, which is aimed at creation of a culture of innovations. Building a better vacuum cleaner is not the same as generating breakthrough ideas. We need to reinvent not just what we do, but how we think about it: “Don’t think about better vacuum cleaners, think about cleaner floors”.
Rae (2003) points out that opportunity-centred learning should play rather wide role in entrepreneurial education compared to traditional education aimed at acquisition of skills and knowledge. Entrepreneurship is most of all related to uncertainties that lead to opportunities.

There are two specialised conceptualisations in the field of entrepreneurship: process or method based. Neck and colleagues (2018, 2014) conceptualise entrepreneurship as a method opposite to a process. Process is concentrated more on the “input” and “output”; distinctively, a method is more oriented to practice. Entrepreneurship is not enough to make input, we need creativity, and afterwards we can expect good results. It is obvious that successful entrepreneurs need to be competent in both method and process.

![Coexisting conceptualisations of entrepreneurship](image)

Figure 1. Coexisting conceptualisations of entrepreneurship (identification of factors based on Neck and colleagues, 2018, p. 39)

Neck, Greene, and Brush (2014) developed different games for students teaching them how to deal with opportunities and uncertainties. Moreover, game playing raises students’ awareness of the difference between managerial and entrepreneurial thinking (ibid, p. 105).

**Conceptualisation of Entrepreneurship in the Context of Sustainable Development and Education**

A number of authors refer to entrepreneurship as the creation of new business, in particular start-ups. According to Greco and Jong (2017), sustainable entrepreneurship is rather oriented to transforming existing enterprises instead of creation of new ones. Such an approach allows applying the theories of entrepreneurship to not-for-profit organisations (e.g., social entrepreneurship, ecopreneurship). Together, established organisations and start-ups can initiate and accomplish sustainable development, working in symbiosis in a co-creation process, depending on each other for mutual success. Kardos (2012) notes that a sustainability approach not only contributes to the sustainable development of the organisation itself but also creates an increasingly large contribution of the organisation to sustainable development of the market and society as a whole.
Sustainable development is to find an optimal interaction of economic, human, environmental and technological systems. Therefore, sustainable entrepreneurship is a wide concept encompassing human, technological, and business factors: Balancing economic health (profit), social equity (people) and environmental resilience (planet) through entrepreneurial behaviour is what identifies a sustainable entrepreneur (Hockerts & Wüstenhagen, 2010; cited in Greco & Jong, 2017). According to Kardos (2012), we talk about sustainopreneurship and sustainability entrepreneurship, “meaning to use creative business organising to solve problems related to the sustainability agenda to create social and environmental sustainability as a strategic objective purpose” (p. 1031).

Conceptual level brings a convincing relationship between entrepreneurship and sustainable development. Recently, we have witnessed a growing number of empirical evidence as well (Kardos, 2012; Stefanescu & On, 2012). Research by Kardos (2012) provides meaningful evidence: “the emergence and growth of innovative firms are crucial for structural change towards sustainable development” (p. 1034). However, measurement of such kind of relationship remains difficult, as there is no method agreed upon, we have to deal with multidimensional concepts, and there are many differences among countries in fixing indicators for sustainability due to entrepreneurship.

Education is a factor that could help integrate all different aspects; however, some experts criticise efforts of education to fulfil demands of economic development: “Teacher education reform in the 21st century can be criticised for being almost exclusively oriented toward principles of economic growth, effectiveness, and competitiveness at the expense of other important aims of education in the global era” (Rönström, 2013, p. 194). Despite certain criticism, there is a growing stream for changes in education that foster entrepreneurship at both national and global scales. Entrepreneurship as a global phenomenon unfolds through growing numbers in talent migration.

Methodology

We have chosen a natural group interview method as a unique one for supporting our research spirit and aims. Group interview is often confused with focus group discussion (Fontana & Frey, 2003). We give priority to a group interview due to the following reasons. Group interview is conducted as a systemic unstructured questioning of several individuals simultaneously in different settings of university environment (i.e., one in a lab, one in a discussion room, and one in an administration office). Group interviews are helpful to follow naturalistic inquiry spirit; they not only give unique data for researchers, but also are stimulating for respondents, aiding recall. For interview there were chosen groups within the ‘natural’ context of the research setting. Because of being embedded in ongoing life, interviews with natural groups often do not follow the controlled format and procedures compared to focus groups interviews. The natural group interviews provide a forum where different views could be freely expressed in a natural setting.

Three separate group interview were conducted as follows: four university students who have developed start-up projects in recent five years, three university teachers who give supervision for the students’ idea development, and four administration specialists who provide management support for projects. Students sample consists of four males, average age 27 years; three students are from the field of technologies, and one student from business management. Right now three of them continue working at the University. One of these students continue working with successful start-up development. University
teachers sample: two men, one woman, all they are from the field of technologies, average age 56 years. Administrators sample: three women, average age 43 years. With each group have been held one interview session.

As all participants of group interview already have experience in participating in entrepreneurial activities, the core questions for raising discussion were as follows: what is motivation for being involved to entrepreneurial activities? What kind of support do you need? What is the role of university teacher? What impact is form the education? What is the role of people in university administration? What administrators have learned from early experience of giving support for entrepreneurial activities? What have you learned from early entrepreneurial activities?

Interpretative analysis was applied for group interview materials. In addition, tacit academic experience of article authors has been involved, which facilitates the research process through recording observations, thoughts and questions as they set in the diary for later use to stimulate reflective thinking.

Research Results on Early Entrepreneurship Experience at University

According to group interviews, opportunities are the main point to engage in entrepreneurial activities. It is consistent with a general situation; moreover, Degeorge and colleagues (2011) note, it is a pervasive theme in entrepreneurship research articles. Students talk about an opportunity as something different from both what they are used to and what should be tested. In a certain sense, an opportunity is seen as a subjective experience and an experiment with new ideas. Only to a limited extent, students associate opportunities with the creation of new knowledge. On the contrary, teachers perceive the opportunity as an objective point through a rational-analytical approach. Discussions and consultations are the space where students and teachers’ different approaches towards an opportunity interact with the discovery of new possibilities.

Figure 2. Interpretative analysis: characteristic notices of group interviews
Our respondents talk about highly complex situations, which are challenging to handle following the foreseen project plan. Eventually, they all increasingly employ intuition. It is very important to help students to recognise intuition through strengthening analytical reflections with the teacher’s supervision. According to Shapiro and Spence (1997), intuition as a complex and unconscious process induces a feeling of certainty; however, it lacks rational reasoning. It is difficult to evaluate the effects of intuition before the results become apparent. Here, decisions are taken instantaneously, in the heart of action, without recurring to conscious analytical reflection; they are intuitive as opposed to rational reactions (cited in Degeorge, 2011). To make an educational impact, it is important to know different aspects of intuition, following Atkinson and Claxton (2001):

- expertise – the unreflective execution of intricate skilled performance;
- implicit learning – the acquisition of such expertise by non-conscious or non-conceptual means;
- judgement – making accurate decisions and categorisations, being able to explain or justify them;
- sensitivity – a heightened attentiveness, both conscious and non-conscious to details and situation;
- creativity – the use of incubation and reverie to enhance problem-solving;
- rumination – the process of “chewing the cud” of experience in order to extract its meanings and its implications.

Atkinson and Claxton (2001) see a great challenge in enlarging the education of intuition in business management programmes.

It seems that entrepreneurship is a highly chaotic and unpredictable activity. However, it has to seek for a certain degree of order to “normalize unpredictability” (Walls, 2017). Sensemaking is the process of creating situational awareness and understanding in situations of high complexity or uncertainty in order to make decisions. Sensemaking describes the negotiation and creation of meaning, or understanding. Weick (1993) argues, “The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs” (p. 635). Students starting entrepreneurial activities with a driving force of opportunities face a great challenge to manage the complexity. Sensemaking is a helpful approach for both teachers and students to develop a certain order in a highly complex system. Students report a great need for help in communication and teamwork development that is important for sensemaking development. In Madsbjerg’s (2017) conceptualisation, knowledge is an important factor for sensemaking. Hajizadeh and Zali (2016) analysed the impact of prior knowledge on entrepreneurial activities and concluded that it was an important issue especially in technologies; however, it could not be overestimated. Madsbjerg (2017) draws attention to knowledge within a social context:

- subjective knowledge (the world of personal opinions and feelings, a reflection of our inner lives);
- shared knowledge (our public and cultural knowledge; it involves sensitivity to our various social structures by capturing nuances such as mood);
- sensory knowledge (to some extent, it can be equated to “sixth sense”).

In our research, teachers help students to connect objective knowledge to a social context. However, teachers admit that each case is individual and they lack generalised experience for such a practice.
Discussion

Entrepreneurship signifies a new type of economy and a different trend for human development: “*homo economicus* provides room for *homo entreprenaurus*” (Costa & Saraiva, 2012, p. 588). Post-school entrepreneurship education is considered the fifth important factor out of twelve in the entrepreneurship ecosystem (Neck et al., 2018). This implies the role of university as a key driver, particularly at the early stages of entrepreneurship development.

In many different studies, evidence-based data prove that the role of education is very important for entrepreneurship. However, there is a lack of consistent theoretical background for systemic estimation of the impact which education can accomplish for entrepreneurial activities. Education is mainly considered a fostering motivation for business-oriented entrepreneurship. Educational programmes are a valuable prerequisite for entrepreneurship when they are based on the integration of complex factors encompassing theoretical knowledge, competence development, and confidence fostering. Growing attention to sustainability entrepreneurship is being witnessed as well. However, we do not have a clear answer if the same models of education could be equally effective for both business-oriented and sustainability entrepreneurship. Our research results are consistent with aforementioned notion that needs for entrepreneurial education and could not be framed within one particular educational model.

Group interview method was really useful for understanding the complex behaviour of entrepreneurs without imposing any a priori categorisation and for developing unique insights into the human experience. Our research has its limitations due to a small size of the sample. We hope this opens the perspective to new and challenging research. We suggest our conceptualisation as a unique base for further research with an extended sample.

Conclusions

There are two coexisting paradigms of method and process in relation to entrepreneurial education. The approach of method is more suitable for the educational context as it focuses on creativity, idea development, small actions, experimentation; the paradigm of process is suitable for enterprise and business plan development. However, they cannot be opposed as we lack empirical data about their difference of impact that can be caused while applying aforementioned paradigms on experiment basis. Our research demonstrates that in early entrepreneurship experience we can recognise more factors with distinctive features of method approach.

Our research shows that students’ motivation for entrepreneurship when they do not have prior education on the issue is strongly based on the opportunities. When they face the complexity of reality, they need more than separate competences or knowledge; moreover, they need them as an integrated phenomenon. We see sensemaking as the effective approach to respond to the constantly changing environment with the emergence of sustainable entrepreneurship.

Our research implies that it is not difficult to start entrepreneurial activity without a special education programme. However, it is difficult to develop it and finalise successfully. Our experience shows that only one out of four entrepreneurial projects succeeded without special entrepreneurial education. Moreover, the existing research demonstrates that education can help have a bigger number of entrepreneurship initiatives. Therefore,
we can state that there is a clear need for special entrepreneurial education at university that would help have more initial projects, encourage to start, and also to succeed in the future. Development of entrepreneurship initiatives as corporate projects within university fosters in young people’s mind the understanding of sustainable development and its meaningfulness.

References


Correspondence concerning this paper should be addressed to Asta Valackiene, Nemuno str. No. 33, Panevežys LT-37164, Lithuania. Email: asta.valackiene@ktu.lt
Abstract
Professional development in sustainable teacher education has recently shifted to focusing on pedagogical practice rather than theoretical knowledge. Given that, reflection practice can have an effective role in identifying undiscovered potentials of prospective language teachers. Hence, the current study was an attempt to examine the potential core qualities of Iranian prospective language teachers in a way to sustain professional development through merging theoretical knowledge and pedagogical practice. To that end, core reflection model, which is a concept in the context of sustainability, was practiced by ten prospective language teachers through drawing on their reflective journals, focus group discussions, and field notes collected over a four month period. Analysis of the obtained data revealed several core qualities on the three scales of feeling, thinking, and wanting. These qualities appeared to have been developed through interaction of both theoretical knowledge and pedagogical practice. This demonstrates the value of reflection practice as a way toward more development in making sense of teachers’ core qualities. Thus it can lead to positive changes in shaping teachers sustainable professional identity.

Keywords: sustainable teacher education, professional development, core quality, core reflection

Introduction
Over the next decade, many prospective language teachers will enter the community of language instructors in Iran where there are many candidates for learning foreign languages. The major concern is that these recently graduate teachers, who have gone through theoretical knowledge on campus and have admissible level of theoretical knowledge, know little about pedagogical practice. Studies have shown that the prospective teachers who have recently entered the workplace, more often than not, indicate that knowledge acquired on campus do not enable them to handle the uncertainty, the complexity, and the instability of actual practice situations (Korthagen, Loughran, & Russell, 2006; Oosterheert, 2001). Unlike many professions, teaching in many countries like Iran is one of careers without a recognized apprenticeship.
Physicians and surgeons are not asked to make diagnoses or perform operations unsupervised at the end of their classroom training – that supervision is the purpose of internships and residencies. Newly licensed architects are not asked to design a major building during their first week on the job, nor are novice attorneys given the full responsibility for a major case. But a new teacher has the same responsibilities as a veteran with 20 years’ experience (Villani, 2002, p. 31).

The claim about these prospective language teachers is that they have undiscovered potentials or core qualities which can be explored through reflection practice as an effective way to develop their professional life. Reflection practice may promote the development of core qualities such as empathy, compassion, love, flexibility, courage, creativity, sensitivity, decisiveness, and spontaneity in prospective language teachers which in turn contribute to fundamental positive changes in language teacher education and guide them toward their sustainable professional identity. Recently, there is increase interest in developing reflective teaching, particularly in teacher education, as reflection on practice leads to increased awareness and effectiveness as a professional practitioner.

The process of reflection in sustainable teacher education is well documented in literature. As Raus and Falkenberg (2014) mention, one critical dimension to look at sustainability in teacher education is to reflect on teachers’ identity as the main concept which influences teacher decision making, behavior and action. In addition to the concept of professional identity Rashidi and Meihami (2017) believe that language teacher identity is a vexing issue which cannot be considered as an innate attribute acquired once and for ever.

Schon (1983) provides a conceptualization of reflection upon which many later researchers have based their work. For example, Rodgers (2002) defines reflection as a systematic and disciplined way of thinking that comprises the following phases: spontaneous interpretation of an experience; naming the problem(s) and question(s) that arise out of the experience; generating possible explanations for the problem(s) posed; developing and testing the explanations; and efforts to sort out, or live with, the problem(s) posed. In addition, Korthagen (2005) distinguishes between two concepts: reflection and core reflection. While reflection can be understood as a systematic way of improving one’s practice, core reflection involves questioning and reframing a person’s deepest levels of functioning such as identity and mission. As Korthagen (2005) points out, core reflection aims at more durable changes in a person in comparison to reflection.

The Core Reflection approach, developed by Korthagen and Vasales (2005), aims at promoting a deep and transformative kind of reflection in coaching teachers. It represents a shift from a focus on problems and deficiencies toward a focus on strengths; What are people’s strengths and talents? How can they be used? How can you support people in overcoming obstacles, and help them act upon their strengths or their ‘psychological capital’? Core reflection builds on people’s ‘core qualities’ which according to Korthagen (2005) are such qualities as empathy, compassion, love and flexibility. Other examples are courage, creativity, sensitivity, decisiveness, and spontaneity which all aim at overcoming internal and external obstacles to use teachers’ best capacities in practice. Core qualities may be constituted as blends or intersections of three elements: thinking (for instance, clarity, creativity, objectivity); feeling (openness, sensitivity, care, compassion), and wanting (strength, commitment, intention, initiative), and can be
used to explore the authentic self, or the ‘real me,’ that teachers invest in their work (Korthagen & Vasalos, 2005). This involves language teachers consciously evaluating and regulating what they are doing when teaching in general, and planning a lesson, managing the classroom, or implementing pedagogical designs in particular.

Consciousness for core qualities contributes prospective teachers to handle the critical situations in real educational setting. As Kukk and Talts (2007) state, contemporary pedagogy presupposes that the teacher has excellent self-knowledge, knowledge on educational reality and his/her profession, readiness to discuss, possesses analytical skills to describe his/her development and is open to upgrading his/her knowledge and skills. Therefore, most of these qualities, which have been valued, indicate sustainability in the teachers’ professional development. Directing attention to core reflection during their sustainable professional preparation can help prospective teachers to become more aware of the core qualities of their pupils, so that they will be better able to guide these learners in their learning, and help them to mobilize their core qualities, in school and in their future lives (Korthagen & Vasalos, 2005). This brings us to an area which has received very little attention from language educators and researchers in language teacher education to the present day.

The focus on core qualities in teachers is the major characteristic of core reflection which is linked to a recent development in psychology called positive psychology. Seligman and Csikszentmihalyi (2000) state that this movement is a reaction to the fact that for too long psychology has focused on pathology, weakness and damage done to people, and hence on ‘treatments’. They emphasize that ‘treatment is not just fixing what is broken; it is nurturing what is best’. Hence, they stress the importance of positive traits in individuals, which they call character strengths. They mention as examples: creativity, courage, perseverance, kindness and fairness (Peterson & Seligman, 2003; Seligman, 2002). A central issue in positive psychology is how these strengths mediate between external events and the quality of experience, something that is directly relevant to teacher education. Tickle (1995) also emphasizes that these are essential qualities for teachers. He even maintains that “the teacher as a person is the core by which education itself takes place” (p. 136). Peterson and Seligman (2003) emphasize that character’s strengths not only can produce desirable outcomes, but also they can be morally valued in their own right, because “they fulfill an individual”. Peterson and Seligman (2003) add that when people are referring to their strengths, this correlates with a feeling of ‘this is the real me’, that they show ‘a feeling of excitement when displaying a strength’, and ‘a rapid learning curve’.

Since core reflection approach has not been applied to a considerable number of EFL language teaching programs and more specifically to any Iranian contexts yet; the present study may shed some light on this area of language teacher education which has received little or no attention from the researchers and practitioners of the field. Considering the reported effects of reflection in teaching, teacher education and positive psychology, along with the lack of research with regard to the possible role of core reflection approach in language teacher education in Iran, the present study was designed to examine the development of core qualities – strength, commitment, intention, … – which can shape the professional identity of prospective language teachers and guide them toward merging theory and practice in real practice situation. Finally, the present study was designed to incorporate insights from teacher education and positive psychology to provide prospective language teachers with a reflection-based approach to practice
how to recognize and use their core qualities more optimally in order to overcome teaching obstacles and bring out the best in themselves.

Method

Research Design

This study used a qualitative action research approach to integrate theoretical knowledge and pedagogical practice through using core reflection model. This approach reflects a desire to construct a coherent and authentic narrative of prospective language teachers that makes sense of their core qualities. The aims of the study were modestly descriptive in nature, and analysis was qualitative; therefore this study was designed to provide real flavor by building its narrative from descriptions of various data sources rather than by overlaying brief summations with elaborate analysis.

Participants

Through purposeful sampling, ten participants (two males and eight females) were selected. The selected participants were identified with the following selection criteria: (1) MA undergraduate of TEFL, (2) currently teach general English course to non-English-major students at Sheikhbahae University, (3) have less than a year of experience in teaching English at university level, (4) acknowledge a concern to integrate on-campus knowledge with pedagogy. The criterion within purposeful sampling is important for selection because it illustrates attributes essential to the study.

Some opportunities were provided for participants involved in the study to: (1) explore their own perspectives on both theory and pedagogy in teaching English, (2) reflect on the practices they bring to the classroom regarding their planning, points of strength and weakness, questions, challenges and troubles (3) familiarize other participants plus the researcher who was a participant observer in focus groups with their experiences.

Instrumentation

In this study, in order to best explore core qualities of prospective language teachers through using core reflection, focus group discussion, field notes, and participants’ reflective journals were used, along with member checking and auditing as ways of ruling out misinterpretation of ideas and boosting the credibility of the results. Attempts were made to use triangulation through utilizing a combination of data collection approaches to complete the process of validating the accuracy of results and increase more consistency. The balance did not necessarily focus on any one of the multiple methodologies or emergent data used to strengthen the study, but provided a deeper understanding into the relationship between the inquiry approach and the studied phenomenon (Patton, 2002).
Data Collection Procedure

As the first stage of the study, the selected participants were invited to attend an introduction meeting to be familiarized with the aims and procedures of the study as the vague definition of core reflection for the participants could indeed serve as barriers to them for practicing it. The participants were encouraged to discuss the topic within the introduction meeting in which the researcher further elaborated on the phenomena of core reflection practice. Such effort to develop an authentic understanding of the participants’ experiences regarding core reflection practice was very important to develop inquiry that set aside embedded assumptions regarding how this concept might be defined and understood in language teacher education. This was done in order to develop an understanding of how participants perceive and construct their own understanding of what it meant to reflect on their teaching and recognize their core qualities in order to integrate their theoretical knowledge with their pedagogical practice. Then, the participants were asked to keep a reflective journal to reflect on their own practice after each session of teaching general English at Sheikhbahae University during the semester under study. The reflective journals were shared by the researcher before any focus group discussion in order for the researcher to be able to orchestrate the focus group discussions.

Three focus group discussions were held, at three different dates, at the beginning, middle, and end of the semester. The discussions consisted, mostly, of interactions between the researcher as the observer participant and individual prospective language teachers. Each discussion was audio-recorded and subsequently transcribed by the researcher. At the focus group discussion, prospective language teachers came together to reflect on their teaching practice, and to discuss on their points of strength and weakness and suggest solutions for the problems. The focus group discussions clarified the interpretations emerging within the participants’ reflective journals. During and immediately following all discussions field notes were used by the researcher to track information. As the researcher might not clearly recall thoughts and insights that came up during the discussions or when reviewing the data; therefore, field notes were used to highlight such ideas, questions, and insights. This process helped to encourage further description of ideas, thoughts, and interpretations, as well as to highlight further research questions and ideas. After the discussions, field notes were revisited by the researcher to expand on any fragmented ideas or clarify questions or thoughts. The data collected in field notes throughout the discussions were used as a resource to offer a further interpretive stance on what might not have been understood, what was questioned, or what was thought at the time of the discussion.

In an attempt to prevent misinterpretation, after the data was transcribed from the any discussion, each participant had the opportunity to review an electronic copy of their transcripts and verify an accurate portrayal of their comments. Through such member checking process the participants had the opportunity to clarify comments or offer feedback regarding their original responses. Moreover, in order to foster the accuracy and validity of the research study ‘auditing’ was also used. For the sake of a detailed audit check, a log of all research activities, data collection and analysis procedures along with all data which were collected through using research instruments namely as participants’ reflective journals, field notes and focus group discussion transcripts was provided for another researcher who was not involved in the study in order to be examined and reassessed whether the study’s findings were grounded in the data and whether the
inferences were logical. This process of auditing also helped other readers follow each stage of the study and trace through the research logic accordingly.

Data Analysis

The analysis of the whole data set was guided by grounded theory procedures (Strauss & Corbin, 1990) and analytical induction techniques (Le Compte & Preissle, 1993). Analytic induction involves scanning the data for themes and relationships among these themes, and developing and modifying hypotheses on the basis of the data. This was done through hermeneutic cycles of close interpretative readings (Kelchtermans & Vandenberghhe, 1994) of each transcript in order to identify recurrent themes that emerge from prospective language teachers’ articulations about their experiences of turning theory into practice within their workplace. In order to extrapolate thematic interpretations, the steps of qualitative data analysis explained by Rubin and Rubin (2005) were used: (1) recognition, (2) examination, (3) coding, (4), sorting, and (5) synthesis. Recognition, examination, and coding were used to prepare the data while sorting and synthesis to analyze the data. In order to locate frequently referenced concepts and themes to clarify meaning and comprehension of the research topic, recognition was implemented, which involved the process of reading, reviewing, and studying the data. When completing the data analysis process, the concepts and themes were combined to tease out insight in relation to the research questions.

Through cross-case analysis, which Patton (2002) describes as a process used to search for patterns and themes that are similar among the experiences of individuals in order to present a holistic picture, all data were coded. The process was actually “an attempt to understand the whole picture of the study” (Janesick, 2004, p. 7). Themes that exist across the experiences of the participants were highlighted and a description of their experiences was emphasized by utilizing direct quotations; however, only those themes that were meaningful and relevant, “substantively significant and providing enough detail and evidence to illuminate and make that case” (Patton, 2002, p. 503). In other words, data were given open-ended and holistic treatment to allow main features to emerge that best answer the research question. Moreover, the participants in the study were invited to read and make comments on the draft of data analysis in the process of member checking as Taylor and Bodgan (1998) claimed ‘any interpretation of a social scene will be richer if you have induced members of the scene to comment and react on it’. Moreover, in order to foster the accuracy and validity of the research study ‘auditing’ was also used. For the sake of a detailed audit check, a log of all research activities, data collection and analysis procedures along with all data was provided for another researcher who was not involved in the study in order for the study’s findings and the inferences to be examined and reassessed. Finally, the focus remained on constructing an accurate portrayal of the prospective teachers’ perspectives surrounding their understandings of their teaching and their core qualities.

Results and Discussion

All data of reflective journals, focus group discussions, and field notes were coded to answer the research question. The analysis of transcribed focus group discussions and written reflections along with field notes began by dividing data into units of analysis.
The unit of analysis was the smallest unit that bear independent meaning from reflection levels point of view. The data were coded thought by thought, one unit of analysis being one understandable thought or idea with a distinct meaning. Conjunctions, irrelevant stretches of discourse and words with no meaning were not coded. Dividing of all data resulted in 550 units of analysis of which 210 were found from reflective journals, 220 from focus group discussion transcripts and 120 from field notes which were all coded accordingly.

As the second step of the analysis all the meaningful units were coded according to the coding scheme of Korthagen & Vasalos (2005) that was created on the basis of the reflection model. Thereafter, in order to develop a detailed auditing, a log of all research activities, data collection and analysis procedures along with all data which were collected through using research instruments namely as participants’ reflective journals, field notes and focus group discussion transcripts was provided for another researcher who was not involved in the study in order to be examined and reassessed whether the study’s findings were grounded in the data and whether the inferences were logical. Concurrency of 80% in units of analysis and 78% in core qualities was found in 10% sample of all data log; The result could be considered acceptable as it was a first-time introduction of the coding schema of core qualities based on core reflection model in researching prospective language teachers in Iranian context.

The percentage of all units of analysis has been presented with each category that describes a specific core quality. Core qualities were derived from reflective journals, focus group discussion transcripts and field notes concerning the traits of those prospective language teachers in the study.

The core qualities identified were on three scales: Feeling, thinking and wanting. Feeling, thinking and wanting can be considered fundamental potentials of the human organism (Jarvilehto, 2001). The core qualities of the Feeling scale are expressions of the use of emotions which express interpersonal and social qualities, such as openness, enthusiasm, commitment, trust, care, empathy, compassion and tolerance. Besides, the core qualities of the Thinking scale express the effective use of thinking and cognitive skills to understand the world, and to function on the basis of knowledge and understanding. The items of this scale are creativity, structuredness, clarity, and accuracy. As Korthegan (2005) indicated, when through thinking, a teacher arrives at the rational conclusion that a certain pattern of thinking and acting is counterproductive, and also gains an insight into more constructive possibilities, this may have some influence on the teacher’s future behavior. In addition to what mentioned above, the core qualities of the Wanting scale are expressions of the use of will and purpose which represent firmness, decisiveness, perseverance and courage. It is the time when the teacher uses conscious wanting to support his or her own development. In sum, thinking, feeling and wanting are all important in developing professional identity on the basis of core qualities; however, it should be emphasized that actualization of core quality through reflection practice is the key towards professional development specially for prospective teachers who has recently come into touch with their core qualities.

As shown in Table 1, the core qualities on the scale of Feeling derived from journal, focus group discussion transcript and field note are enthusiasm, openness, commitment, and tolerance.
Table 1
Percentage of Occurrence of Core Qualities on the Scale of Feeling in Reflective Journal,
Focus Group Discussion Transcript and Field Note Units

<table>
<thead>
<tr>
<th>Core quality</th>
<th>Reflective journal</th>
<th>Focus group discussion transcript</th>
<th>Field note</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enthusiasm</td>
<td>43</td>
<td>36</td>
<td>31</td>
<td>35</td>
</tr>
<tr>
<td>Openness</td>
<td>24</td>
<td>21</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Commitment</td>
<td>19</td>
<td>23</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Tolerance</td>
<td>14</td>
<td>20</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Enthusiasm is generally recognized as one of the most essential qualities of effective teachers. This core quality has a twofold effect which motivates students to go well beyond the minimum in their achievement and stimulates a kind of trusting relationship. The prospective language teachers in the present study indicated their enthusiasm by instances where they feel fascinated about their teaching and interaction with their students. They made sense of their enthusiasm through growing their passion towards their carrier and constantly developing the pedagogies involved in their students learning. As one of the teachers in this study indicated: *I feel really fascinated with the sense of accomplishment when I see my students have developed their skills and are able to communicate through using their second language. At that moment I tell myself “I did it”*. In line with what is believed by this teacher another prospective teacher in this study claimed that: *I would like to help my students build their self-esteem in order to believe that everything is possible. I try to teach them how to set their goals as I believe that as a teacher we are responsible to teach beyond the teaching subject.*

Another core quality was openness which represents curiosity for trying new things and open-mindedness in accepting others ideas. This quality was the least evident characteristic among the prospective teachers in the study. The reason would be their being too conservative in teaching for the sake of class management or class stability. The teachers indicated that they prefer not to give different things a try but to keep on the same path in order to be able to expect the following events and manage the class. Here there is need for more intervention by the teacher educators to assure the prospective language teachers about the significance of this quality in pedagogical practice. They are required to feel safe and comfortable while making sense of the quality of openness through reflection practice which can enable them to juxtapose different alternatives to realize the most appropriate reaction at the time of unexpected events. With regard to this core quality one of the prospective teachers indicated that: *I try to behave as an open-minded person so I allow my students to have comments about my methodology, material and in general my teaching.* However, the majority of teachers were worried about losing face in the class, as one of them said: *I am always afraid of losing face by mispronouncing a word in my class, I think I need to work on my pronunciation more.* In line with the mentioned idea of one of the teachers, another prospective teacher claimed that: *I think students get used to the routines of the class, therefore, changing directions and applying new methods of teaching for the sake variety may cause a couple of troubles.*

Teacher commitment has been identified as one of the most critical factors for the future success of education and schools (Huberman, 1993). Teacher commitment is another core quality which is an essential element of successful teaching. The prospective language teachers in the present study indicated their commitment by their concern for
achievement of their students and their quality of their teaching practice. As one of the teachers indicated: We shouldn’t overlook the experiential aspect of language learning because it reduces the value of teaching; In my view, to achieve high quality of language education especially in foreign contexts we need both knowledge of use and usage of language. Therefore, we should teach the students the language besides teaching about the language. Such convictions are sometimes very deeply rooted in the mind of the teachers which can easily shape their professional identity.

The prospective teachers mentioned some situations where they tried to cultivate students’ curiosity and interest in learning which represent the sense making of teacher commitment and loyalty. The degree of such loyalty of committed teachers can increase if they practice reflecting on their teaching in order to analyze their pedagogical practice to perform their roles more effectively and establish a good teacher-student relationship in accordance with the professional values. For instance, one of the teachers in this study indicated: When I find my students demotivated and frustrated in class, I try to change the atmosphere by telling a joke or making a fun situation.

The last core quality on the scale of feeling in the present study is tolerance. It can also be described as respect and appreciation of the rich diversity of individuals along with their various personality types, learning styles, and forms of expression. The prospective teachers in the present study identified this core quality from two different perspectives; some believed that this not something which can be learnt as a teacher, “you are either a tolerant teacher by nature or not” they expressed. Therefore, they doubted about the significance of reflection practice over such virtue. As one of the prospective teachers indicated: I love teaching and I can cope with it very well; I am very patient and I do not lose my nerve very quickly so I think I was born to be a teacher; I think teaching can improve my character since I learn many things when I am teaching.

The other group indicated tolerance as the quality which makes teachers be able to read and interpret pedagogical situations and students even over their masks. For the second group reflection practice and self development can lead to professional identity in general and tolerance in particular. Reflecting on some incidents in classroom, both groups narrated some instances of being intolerant with students and were enthusiastic about learning some practical solutions for this problem. Discussing intolerance in teaching in focus group discussions, the prospective teacher came to this conclusion that such intolerance is rooted in failure of true perception of students as their real selves besides lack of empathy and openness to signals students send. As Afdal (2005) indicated, tolerance is consideration of students backgrounds, their motives, the particularities of the situations; a tolerant teachers must be perceptive, over-concerned with developed empathy. In line with the mentioned idea, one of the teachers indicated her concern with regard to the quality of tolerance in this way: I think we need to have a clear understanding of our students backgrounds, however, lack of enough time and large number of students in class would not provide such opportunity for us, therefore, moving towards appreciating individual differences is more difficult.

In addition to above mentioned core qualities on the scale of feeling, Table 2 indicates the core qualities on the scale of Thinking derived from journal, focus group discussion transcript and field note as creativity and clarity.
As Plucker (2004, p. 14) defined “creativity is the interaction among aptitude, process and environment by which an individual or group produces a perceptible product that is both novel useful as defined within a social context”. This core quality has a lot to do with professional identity and mission which are the deepest level and the ultimate goal of core reflection practice. For prospective language teachers who have recently finished their studies on campus and entered the workplace, it is quite evident to be proponents of ideas, methods and approaches of others. While this dependency may be helpful at early stages, freezing at this level may be a barrier towards their professional development. Therefore, in order for prospective teachers to develop their own philosophy of education along with the ability to think independently, making sense of creativity is essential.

The prospective teachers in the study reported their attempts to be creative in classroom through using group working, brainstorming, different ways of comprehension checking, and some other strategies; however, the majority of them believed that they were not successful in this regard and do not call themselves as creative teachers. As one of the prospective teachers in this study mentioned: *I try my best to merge my theoretical knowledge with my teaching in classroom, however, I think I am not pleased with my attempts. Sometimes I think we got stuck in method era yet and the prescriptive atmosphere and pressure of the educational environment would not let us achieve our potentials.*

Analyzing and discussing on the issue in focus group discussions, they identified some blocks which demotivated them from making more attempts to make sense of this core quality. These blocks were of various types made either by social environment, educational setting, students, or the teachers themselves. The conclusion drawn from discussion on this core quality was to practice reflecting on creativity both individually and collaboratively in order to remove the blocks in an effective manner which leads to develop their professional identity.

Teacher clarity is one of the essential core qualities which is defined as a variable which represents a process by which an instructor is able to effectively stimulate the desired meaning of course content and processes in the mind of students through the use of appropriately-structured verbal and non-verbal messages (Chesebro, 1998). Clarity behavior of the prospective teachers in the present study was reflected by the instances of their use of outlines (e.g., *“today we will discuss three topics: a, b, and c”*), transitions (e.g., *“now that you have learned present tense, let’s turn to past tense”*), examples (e.g., *“you can use this point in sentences such as…”*), definitions (e.g., *“this means….”*), graphic organizers (e.g. graphs, tables, diagrams, …), importance markers (e.g., *“The point which makes it very important is…”*), and summaries (e.g., *“today we discussed three topics”*). While this core quality is one of the most important skills we can develop in learning how to effectively guide our students to success which help students enjoy the learning process and be better equipped to remember and apply course content,
instructor clarity cannot be isolated to a single set of behaviors; the concept is multi-
dimensional, including behaviors that span multiple modes of communication that have
diverse intended outcomes (Titsworth & Mazer, 2011). Therefore, rather than devising
a set strategy for being clear, instructors are advised to assess students’ understanding
as a lesson is unfolding and adapt their behaviors as necessary to promote understanding
(Titsworth, 2010).

In addition to above mentioned core qualities on the scale of feeling and thinking, Table 3 indicates the core qualities on the scale of wanting derived from journal, focus
group discussion transcript and field note as firmness and grit.

Table 3
Percentage of Occurrence of Core Qualities on the Scale of Wanting in Reflective Journal,
Focus Group Discussion Transcript and Field Note Units

<table>
<thead>
<tr>
<th>Core quality</th>
<th>Reflective journal</th>
<th>Focus group discussion transcript</th>
<th>Field note</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmness</td>
<td>48</td>
<td>38</td>
<td>34</td>
<td>41</td>
</tr>
<tr>
<td>Grit</td>
<td>52</td>
<td>62</td>
<td>66</td>
<td>59</td>
</tr>
</tbody>
</table>

One of the common challenges of prospective teachers regarding classroom manage-
ment is to draw the line between coming off as too kind or too firm. This may cause
them having hard time balancing both kindness or firmness in the classroom. This core
quality has a significant impact on the behaviors of the students in classroom and is
directly related to establishing realistic expectations and consequences involving saying
what we mean, and meaning what we say. Students respect and respond well to teachers
who demonstrate that they are not easily swayed by student pleas or protests and who
treat all students the same regardless of ability, personality, or past experience. As one
of the teachers in the study indicated: I really do not know how to react towards those
naughty students in classroom; sometimes I want to ask them to leave the class and
sometimes I rather leave the class myself. Another teacher mentioned: The behavior of
students is the reflection of our behavior in the class, therefore, if we respect them, we
will receive care and respect in return.

The prospective language teachers in the present study indicated this core quality
through reflecting on the cases when the class was out of control or students did not
follow the rules; when they have to use I-messages to show the students that their
behaviors were creating discomfort for the teacher or the other students “I expect you
to…”; and when one or some students complain about the lesson, refuse to participate
and look upset or angry. They claimed that to be inclined to firmness in the this continuum
works more effectively as they can control the students behavior and keep them focused;
however, this core quality was discussed comprehensively in focus group discussions to
contribute prospective teachers to realize the importance of making balance between
firmness and kindness through using some strategies such as ignoring the minor infraction
of a rule or a misbehavior of a student in the classroom which is of short duration and
does not interrupt the momentum of the lesson.

The second core quality on the scale of wanting is teacher grit which is defined as
“passion and perseverance for very long term goals.” This could easily be a definition
of a successful teacher: When faced with challenges, effective teachers let their passion
guide them as they persevere to find the right solutions. The effect of grit on outcomes is
through cumulative effort: gritty individuals tend to work harder than their peers, and
they remain committed to chosen pursuits over a sustained period of time (Duckworth, 2010). Gritty teachers remain in the classroom and work harder, and more deliberately, toward producing academic gains in their students.

The prospective language teachers in the study revealed their grit when they were discussing about their long term goals in teaching; they indicated their concern for merging their theoretical knowledge they learnt on campus with their practice in their classes in order to make best of their potentials. They were not pleased with any specific level of achievement and sense of accomplishment; rather they indicated degrees of ambition and long-term passion which would lead them towards shaping their professional identity. As one of the prospective teachers in the study indicated: I always try to make use of what I learned on campus practically in my classes and I believe that practice can make me a real teacher.

Conclusion

The present research was aimed to find out the undiscovered potentials or core qualities of prospective language teachers through core reflection practice which leads to positive changes in shaping their sustainable professional identity. The results showed that the core qualities which were derived from reflective journals, focus group discussion transcripts and field notes were classified on three scales of feeling, thinking and wanting which were all essential in developing sustainable professional identity of teachers and contributed to sense making of core qualities. The core qualities identified on the scale of feeling were enthusiasm, openness, commitment and tolerance; the core qualities on the scale of thinking were creativity and clarity; and the core qualities on the scale of wanting were firmness and grit.

In conclusion, utilizing core reflection model in teacher education for prospective language teachers seems to be successful, because the mentioned model fostered sense making of core qualities which would facilitate movement from beginning to professional teacher and contribute to sustainable development of professional identity. This research may highlight the importance of unique individual qualities that prospective language teachers bring to their work. Such practice may recognize teachers as learners too, and claim that the principles of learning through reflection should be encouraged for prospective teachers to be applied to their own sustainable professional learning and identity.

References


Correspondence concerning this paper should be addressed to Bahareh Khazaeeenezhad, No.73, 3rd Golestan Alley, Bostan Alley, 1st Apadana St., Isfahan, Iran. Email: b.khazaeeenezhad@gmail.com
Assessing Teacher Competence and Its Follow-up to Support Professional Development Sustainability

Sumaryanta, Djemari Mardapi, Sugiman, and Tutut Herawan
Yogyakarta State University, Yogyakarta, Indonesia

Abstract
Teacher assessment has been recently considered as a minor issue in Education. Therefore, there is lacks teacher’s competency assessment as the basis for the sustainability of teacher profession development. This study was on attempt to describe the model of teacher assessment which had been implemented in Indonesia and its challenges to encourage the development of a sustainable teacher profession. The data was collected through documentation. Moreover, some interviews were conducted about (1) teacher competency test in 2012–2014 by 1,611,251 teachers; in 2015 by 2,699,516 teachers, and in 2016 by 427,189 teachers, and (2) teacher development programs as a follow-up of teacher competency tests. The obtained data was analyzed by descriptive quantitative and qualitative, respectively, on the document study result data and the interviews. The teacher competency test results were used to measure the mastery of pedagogic and professional competence of teachers at all subject matter and all levels of schools in Indonesia. Furthermore, the results are used as the basis for determining teacher quality improvement program in Indonesia continuous training. They are expected to provide best practice information from the implementation of teacher competency mapping done in Indonesia including its follow-up in order to develop the teacher’s sustainable profession.

Keywords: teachers, assessment, sustainable profession development

Introduction
Teacher assessment is still a minor issue in educational assessment. Discussion on the assessment recently is dominated by focusing on the assessment of student achievement. In fact, an assessment of the competence and performance of teachers are as important as the teaching task itself (Darling & Hammond, 2010). Teachers are the key factors that influence the success or failure of the student learning. Besides, being important in the context of classroom learning, teachers also play an important role in social transformation (Okeke & Mtryuda, 2017). The teacher’s central position in student learning must be balanced with sustained teacher quality monitoring.

The teacher’s assessment is not only to know the extent to which teachers master the taught material, but also to encourage self-sustained teacher development (Wilkerson & Lang, 2007). The results of this assessment are also useful for the purposes of decision...
making in teacher coaching. The resulting program is based only on assumptions and speculative analysis often mismatch and misdirected, which at the end will only result in failure. In contrast, teacher coaching programs that are preceded by competency mapping, which are further analyzed as the basis of the program, are expected to be more effective and efficient.

Internationally, there has been an increasing interest in assessing teacher competence driven by demand for quality assurance and greater recognition of the teaching profession (Roelofs & Sanders, 2007; Vermunt & Verloop, 1999). Teachers, increasingly, have been accepted as a profession that has a vital position and role in the development of human life as the more awareness of the role of education in human development. Awareness rising on the importance of teacher roles implicates higher demands on teacher quality. The assessment of teacher competencies serves as a way to know how great the quality of teachers.

Various countries, including Indonesia, have conducted teacher competency tests (TCT) as part of the teacher competency mapping process. For a country with a very large number of teachers, such as Indonesia with almost 3 million teachers, performing competency assessments (PCA) and TCT are not easy tasks. The next challenge is not only on the implementation of assessment which is not easy, but also on how to follow-up the results of the PCA and TCT. In the massive TCT, technical implementation of tests for a large number of teachers, analysis of test results, and the formulation of follow-up test results are complex tasks.

The Government of Indonesia has made a major program in assessing teacher through Teacher Competency Test (TCT). The TCT is conducted to measure the mastery of pedagogic competence and professional teachers. The TCT have been massively implemented since 2012 and continue up to now. In 2014, there are 1,611,725 teachers who have assessed through TCT. Subsequently, in the year 2015 there is nationwide TCT followed by 2,699,516 teachers in Indonesia.

This study was intended to describe the teacher competency test model that is implemented nationally in Indonesia through TCT along with the results and its follow-up to develop and implement the teacher competency improvement program. This study reveals on how the competency test model that has been implemented in Indonesia, how the results obtained, and what follow-up of the competency test results in improving the quality of teachers. More specifically, the research questions addressed through this study are given as follow:

1. What are the objectives of the teacher competence test?
2. What are the competencies measured in the teacher competence test?
3. What kind of questions are used for the teacher’s competency test?
4. How to implement the teacher competency test?
5. What is the result of teacher competence test?
6. How is the teacher competency test in the context of teacher professional development?
7. What kind of program for follow-up teacher competence test that has been implemented?
8. What is the outcome of the follow-up program in improving teacher competence?

The results of this study are expected to provide best practice information on the implementation of teacher competency mapping conducted massively, as well as its follow-up for the development of teacher profession.
The continuing education is not an option but a necessity to address the challenges of growing human needs (Donaldson et al., 2013). Teachers, as a key component of education, face new challenges and changes that require them to equip themselves with new knowledge and skills (Kabadayi, 2016). Professionalism of teachers must be run in accordance with the development of science, technology, art, and progress of society and era (Mulyasa, 2013). Teachers who continue to learn are an essential component for the realization of continuing education as a catalyst to build human civilization in a better direction.

The assessment of teacher performance competency and evaluation should be conducted in a way to improve teacher performance. The assessment of teacher competence is not only to determine the extent to which teachers master the taught material but also encourage self-development of teachers (Wilkerson & Lang, 2007, p. 17–18). Evaluation of teachers tasks can: (1) improve teachers’ performance in performing professional duties (improvement function); and (2) ensure teachers to perform better in learning development of students (accountability function) (OECD, 2009). Without assessment and evaluation on the performance of the task, the teacher will be less motivated in learning and developing. In fact, only from teachers who continue to learn will emerge a generation of learners throughout life who are able to continue to contribute to society and the environment.

The mapping of teacher competence and performance can be conducted in various ways, including: Test, training record, performance observation, portfolio, product, and learner work example (Wilkerson & Lang, 2007). For mapping teacher competencies in a broad scope, e.g. nationally, tests are a better alternative. Tests can be conducted to capture the picture of teacher competence in large numbers. Standardized tests will provide accurate and accountable assessment results.

The assessment of teacher competencies requires a clear definition of what competencies are assessed to guide evidence collection and assessment (Roelofs & Sanders, 2007). Although in general people already have perceptions about the meaning of competence, but really competence is a broad and diverse terminology (Vathanophas, 2007). Experts interpret the competence of teachers in various ways. Teacher competence is an accumulation of capabilities to facilitate learning (Carreker & Boulware, 2015). Teacher competence refers to performance and rational action to meet certain specifications in the task of education (Mulyasa, 2007). Teacher competence is a multi-dimensional construct, not only of pedagogical competence but also of professional competence (Baumert & Kunter, 2006). Teacher competence includes: pedagogical competence, subject-didactic competence, pedagogical-organizational competence and self-reflection competence (Hospesová & Tichá, 2000), while Redding (Reeding, 2014) and Carreker & Boulware (Carreker & Boulware, 2015) stated that there are four personal competence of teachers, namely: Cognitive competence, metacognitive competence, motivational competence, and emotional/social competence. Many of the scope of these competencies require careful determination of the focus of assessment in assessing teacher competency.

The competency map of the assessment results is needed as the basis for the preparation of teacher quality improvement program that is teacher training program. Training that is designed without accurate data often does not meet the needs (Silberman, 2006). Many programs are implemented without a clear needs analysis (Goldstein & Ford, 2002: 10). This then became the cause of much ineffective teacher training.
The competence-based training is currently increasingly popular among educational stakeholders (Acquah et al., 2017). Competence-based training has been adopted for teachers to improve their competence. The adequacy of teacher participation in training activities is essential for professional development (Zineb et al., 2017). Through training activities, teacher competencies that have not met the standards can be improved. Teachers’ competence test becomes very important in the context of providing data for the preparation and implementation of training programs as per the needs of teacher sustainable development.

Method

This study was a descriptive one aimed to describe the implementation of national teacher assessment by teacher competency test (TCT) in Indonesia and its follow-up in supporting the sustainability of professional development. This study was conducted in Indonesia in September 2017 until April 2018. The research was conducted on: (1) the implementation of teacher competency test in 2012–2014 by 1,611,251 teachers, in 2015 by 2,699,516 teachers, and in 2016 by 427,189 teachers, and (2) the implementation of teacher competency development program and its follow-up teacher competency test conducted by the Indonesian government in 2016. The data of this study were collected through documentation and interview study. The documents reviewed in this study were documents on teacher competence test results and the TCT follow-up teacher competence development program from the Indonesian government through the Directorate of Teachers and Education Personnel of the Ministry of Education and Culture, Republic of Indonesia. Interviews were conducted with teachers from various provinces in Indonesia as participants of teacher competency tests, as well as trainers and national speakers of teacher training. The obtained data is analyzed by descriptive quantitative and qualitative, where quantitative analysis is done on document study result data, meanwhile qualitative analysis is done on interview result data.

Results and Discussion

The national TCT in Indonesia is a program launched by the government in order to ensure that Indonesian teachers are qualified (Ministry of Education and Culture, 2015). The TCT is implemented with the aims of: (1) obtaining information on teacher competency figure, especially pedagogic and professional competence in accordance with predetermined standard; (2) obtaining a teacher competency map that will be considered in determining the type of teacher education and training; and (3) assessing the performance of teachers and be considered for policy formulation to give appreciation and appreciation to teachers.

The TCT in Indonesia is not just a project that is implemented without reason and a strong base of thought. The TCT is born as a result of contemplation and long thinking taps the journey of Indonesian nation in managing education. The experience and achievement of the quality of education in Indonesia until now has not been full of encouragement, thus encouraging the government to issue various policies to improve education. The TCT is an instrument in an effort to improve the quality of teachers in Indonesia.

The TCT is conducted to measure basic competence on subject matter and pedagogy in content domain (Ministry of Education and Culture, 2015). The basis for the prepar-
ation of TCT is the Regulation of the Minister of National Education Number 16 Year 2007 regarding Academic Qualification and Teacher Competency Standards (Table 1). The competence of the field of study is tested according to the field of study of each teacher. The pedagogical competence tested is the integration of the pedagogic concept into the learning process of the field of study in the classroom.

Table 1

<table>
<thead>
<tr>
<th>Indonesian Teachers Competency Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspect</strong></td>
</tr>
<tr>
<td>Pedagogic Competency</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Professional Competency</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The competence of the teachers above is breakdown into indicators of achievement of competence (GPA). Based on this GPA the further items about the TCT are prepared. The TCT was in the form of multiple choices of 4 options amounted to 60–100 items worked on for 120 minutes. The TCT is implemented using two systems i.e. online system and offline system. The online system is implemented on an affordable area of the internet network, and has a room that contains computer lab devices, and is connected within an intranet network. Offline or manual systems are implemented in areas not covered by the internet network, and do not have rooms containing computer labs, and are not connected in the internet (Ministry of Education and Culture, 2015). Of the two systems, most of the TCT implementation uses an online system. Offline systems are implemented in a limited area only in areas that are really difficult to implement online.

The TCT becomes one instrument of continuous professional development (CPD) of the teacher in Indonesia (Ministry of Education and Culture, 2016). The CPD of the teacher in Indonesia is the development of teacher competencies that are carried out in accordance with the needs, gradually, sustained, to improve the professionalism of teachers. The CPD of the teacher is part of various efforts to improve the competence of teachers, includes: planning activities starting from the results of self-evaluation, TCT, and PCA by the Principal and/or school assessment team on the implementation of learning in classroom and other tasks (Ministry of Education and Culture, 2016).
Assessing Teacher Competence and Its Follow-up to Support Professional Development

Figure 1 shows that TCT is a key component in teacher career development. The TCT is part of teacher development that is to identify teacher’s competency profile, as a basis for guidance and self-development of teachers. The teacher career development process is conducted simultaneously and sustained, whose level of achievement is identified through TCT again. The new results of the TCT are then used as the basis for further guidance and teacher development.

The TCT is implemented nationally in 2014 and 2015. Until 2014 the number of teachers who have followed the TCT is as many as 1,611,725 people. The analysis on TCT results shows a portrait concerning the competence of teachers nationally as shown in Table 2. The average of TCT score (2012–2014), which is 46.55 as shown in Figure 2.

Table 2
TCT Result (2012–2014)

<table>
<thead>
<tr>
<th>Scores</th>
<th>Kindergarten</th>
<th>Primary School</th>
<th>Junior High School</th>
<th>Special School</th>
<th>Senior High School</th>
<th>Vocational High School</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–10</td>
<td>83</td>
<td>822</td>
<td>527</td>
<td>5</td>
<td>349</td>
<td>89</td>
<td>1,875</td>
</tr>
<tr>
<td>10.1–20</td>
<td>176</td>
<td>4,300</td>
<td>1,068</td>
<td>28</td>
<td>1,620</td>
<td>460</td>
<td>7,652</td>
</tr>
<tr>
<td>20.1–30</td>
<td>3,956</td>
<td>86,175</td>
<td>14,631</td>
<td>834</td>
<td>13,677</td>
<td>5,652</td>
<td>124,925</td>
</tr>
<tr>
<td>30.1–40</td>
<td>19,538</td>
<td>268,408</td>
<td>57,204</td>
<td>3,099</td>
<td>35,822</td>
<td>21,298</td>
<td>405,369</td>
</tr>
<tr>
<td>40.1–50</td>
<td>44,094</td>
<td>264,138</td>
<td>96,833</td>
<td>4,333</td>
<td>50,293</td>
<td>35,833</td>
<td>495,524</td>
</tr>
<tr>
<td>50.1–60</td>
<td>57,025</td>
<td>132,537</td>
<td>86,453</td>
<td>2,377</td>
<td>45,375</td>
<td>32,791</td>
<td>356,558</td>
</tr>
<tr>
<td>60.1–70</td>
<td>36,824</td>
<td>37,478</td>
<td>49,141</td>
<td>652</td>
<td>26,132</td>
<td>17,469</td>
<td>167,696</td>
</tr>
<tr>
<td>70.1–80</td>
<td>8,693</td>
<td>4,733</td>
<td>18,534</td>
<td>74</td>
<td>8,901</td>
<td>5,072</td>
<td>46,007</td>
</tr>
<tr>
<td>80.1–90</td>
<td>452</td>
<td>188</td>
<td>2,930</td>
<td>4</td>
<td>1,225</td>
<td>654</td>
<td>5,453</td>
</tr>
<tr>
<td>90.1–100</td>
<td>3</td>
<td>57</td>
<td>92</td>
<td>–</td>
<td>24</td>
<td>16</td>
<td>192</td>
</tr>
<tr>
<td>Total</td>
<td>170,844</td>
<td>798,836</td>
<td>327,413</td>
<td>11,406</td>
<td>183,418</td>
<td>119,334</td>
<td>1,611,251</td>
</tr>
</tbody>
</table>

Source: Ministry of Education and Culture, 2015
The results of TCT until 2014 became the basis for determining the target of teacher competency improvement by National Development Planning Agency in 2015–2019. The agency targeted from 2015 to 2019 a gradual increasing in teacher competence, as shown in the following Table 3.

Table 3
Target of Teacher Competency Improvement in 2015–2019

<table>
<thead>
<tr>
<th>Years</th>
<th>Target of teacher competency score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 (Baseline)</td>
<td>46.55</td>
</tr>
<tr>
<td>2015</td>
<td>50.50</td>
</tr>
<tr>
<td>2016</td>
<td>60.50</td>
</tr>
<tr>
<td>2017</td>
<td>70.00</td>
</tr>
<tr>
<td>2018</td>
<td>70.50</td>
</tr>
<tr>
<td>2019</td>
<td>80.00</td>
</tr>
</tbody>
</table>

Source: The Strategic Plan of the Directorate of Teachers and Education Personnel 2015–2019

From Table 3 above, the target of teacher competency score is measured by TCT. The results of the TCT are, then, used to determine the participation of teachers in the program of competence improvement that has been prepared by the government, so that cyclic is expected to occur the flow of mapping and improvement of competence simultaneously and sustained. The following up of the National Development Planning Agency program / target, the Indonesian Ministry of Education through the Directorate of Teachers and Education Personnel in 2015 implemented a TCT training program, the Post-TCT Training Program. It is one of the program that is expected to encourage the improvement of teacher competence.

Furthermore, by 2015 the government implemented TCT for almost all teachers in Indonesia. A total of 2,699,516 teachers, including kindergarten, elementary, junior high school, junior high school, and vocational high school teachers have attended TCT in 2015, with details as listed in the following Table 4.
Table 4
Teacher Data of TCT Participants in 2015

<table>
<thead>
<tr>
<th>No</th>
<th>Level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kindergarten</td>
<td>252.631</td>
</tr>
<tr>
<td>2</td>
<td>Primary School</td>
<td>1,389.859</td>
</tr>
<tr>
<td>3</td>
<td>Special School</td>
<td>21.287</td>
</tr>
<tr>
<td>4</td>
<td>Junior High School</td>
<td>561.164</td>
</tr>
<tr>
<td>5</td>
<td>Senior High School</td>
<td>254.166</td>
</tr>
<tr>
<td>6</td>
<td>Vocational High School</td>
<td>220.409</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,699.516</td>
</tr>
</tbody>
</table>

Source: Directorate of Teachers and Education Personnel, 2015

The result of TCT in 2015 shows the national average is 56.69. It exceeds the target of achieving the national average value of 2015 set in Ministry of Education and Culture strategic plan, which is 55. Meanwhile, from the aspect of competence, the average achievement of the pedagogy competency 52.37, and average achievement of the professional competence score 58.55 (Ministry of Education and Culture, 2016). In more detail, the 2015 TCT results are presented in Table 5.

Table 5
Results of TCT Year 2015

<table>
<thead>
<tr>
<th>Score</th>
<th>Kindergarten</th>
<th>Primary School</th>
<th>Junior High School</th>
<th>Senior High School</th>
<th>Vocational High School</th>
<th>Special School</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1−10</td>
<td>24</td>
<td>280</td>
<td>157</td>
<td>46</td>
<td>59</td>
<td>2</td>
<td>568</td>
</tr>
<tr>
<td>11−20</td>
<td>89</td>
<td>1,074</td>
<td>715</td>
<td>295</td>
<td>179</td>
<td>12</td>
<td>2,364</td>
</tr>
<tr>
<td>21−30</td>
<td>1,096</td>
<td>28,659</td>
<td>10,805</td>
<td>4,371</td>
<td>2,708</td>
<td>242</td>
<td>47,881</td>
</tr>
<tr>
<td>31−40</td>
<td>9,652</td>
<td>183,896</td>
<td>54,381</td>
<td>19,791</td>
<td>18,200</td>
<td>1,719</td>
<td>287,639</td>
</tr>
<tr>
<td>41−50</td>
<td>35,908</td>
<td>330,638</td>
<td>108,252</td>
<td>39,095</td>
<td>42,404</td>
<td>3,901</td>
<td>560,198</td>
</tr>
<tr>
<td>51−60</td>
<td>77,816</td>
<td>405,946</td>
<td>140,843</td>
<td>54,438</td>
<td>58,710</td>
<td>6,428</td>
<td>744,181</td>
</tr>
<tr>
<td>61−70</td>
<td>94,774</td>
<td>278,257</td>
<td>129,623</td>
<td>59,486</td>
<td>57,970</td>
<td>5,708</td>
<td>625,818</td>
</tr>
<tr>
<td>71−80</td>
<td>30,522</td>
<td>125,991</td>
<td>77,657</td>
<td>45,623</td>
<td>29,896</td>
<td>2,734</td>
<td>312,423</td>
</tr>
<tr>
<td>81−90</td>
<td>2,721</td>
<td>31,104</td>
<td>32,900</td>
<td>24,095</td>
<td>9,380</td>
<td>501</td>
<td>100,701</td>
</tr>
<tr>
<td>91−100</td>
<td>29</td>
<td>4,014</td>
<td>5,831</td>
<td>6,926</td>
<td>903</td>
<td>40</td>
<td>17,743</td>
</tr>
<tr>
<td>Total</td>
<td>252,631</td>
<td>1,389,859</td>
<td>561,164</td>
<td>254,166</td>
<td>220,409</td>
<td>21,287</td>
<td>2,699,516</td>
</tr>
</tbody>
</table>

Source: Directorate of Teachers and Education Personnel, 2015

The results of the TCT are, then, processed based on various aspects, by region, school level, subject, age and gender of teachers, and others as needed. These processed data are, then, used to formulate policies for the development and development of teacher competence, both at the national and regional levels. The results of TCT can be used as the basis for developing teacher quality improvement program at school level, even individually by each teacher.

Based on the results of the TCT, each teacher receives a competency map that is mastered in the form of a report book of each teacher. The teacher report book presents the achievement data of each teacher of TCT result as stated in 10 Groups of Competency (GC) i.e. GC-A, GC-B, GC-C, GC-D, GC-E, GC-F, GC-G, GC-H, GC-I, and GC-J.
Each GC contains a set of pedagogical competencies and professional competencies. The contents of pedagogical and professional competencies in the teacher report book vary for each different subject. Hence, this is tailored to the teacher’s competency demands based on the subjects taught. The individual teacher report book is presented graphically, an example of a teacher report book is shown in the following Figure 3.

<table>
<thead>
<tr>
<th>No.</th>
<th>Group of Competency</th>
<th>Status</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mathematic GC-A</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mathematic GC-B</td>
<td>FAILED</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mathematic GC-C</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mathematic GC-D</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mathematic GC-E</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mathematic GC-F</td>
<td>FAILED</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mathematic GC-G</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mathematic GC-H</td>
<td>FAILED</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mathematic GC-I</td>
<td>PASSED</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mathematic GC-J</td>
<td>PASSED</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3. Examples of teacher report books on mathematics subjects*

The teacher report book is presented in red and black. The red color indicates that in the competence group the teacher has not reached the minimum standard of competence that the teacher must master. The black color indicates that in the competence group the teacher has reached the established competency. Minimum standards used as teacher completion limits are set nationally for each year according to the competency targets established during the current year: 2015 standards 5.5, 2016 standards 6.5, 2017 standards 7.0, 2018 standards 7.5, and 2019 standard 8.0. This means, for example, that by 2017 the attainment of teacher competence in a competence group of 67, then the report book on the competence group is red. In other competence groups, for example, the teacher obtained 81, and then the report book on the competence group is black. Further teacher report books serve as the basis for providing follow-up programs for individual teachers to improve the teacher’s competence.

From the interviews, the feedback is very positive. The results of the TCT in the form of reports given to each teacher are considered to have significance for the teacher. Based on the acknowledgment of several teachers of interview respondents of this study who said that the report on the results of TCT in the form of individual reports of teachers remind teachers about the level of mastery of competencies controlled by the teacher. Based on these reports the teacher knows which competencies are by default met by and which do not meet the standards. It is as said one respondent named Karim as follow:

*TCT has been done by the government has succeeded in showing the level of mastery of teacher competence which during this time teachers never know how the level of control of competence. During this time when learner learning outcomes are less satisfactory then the focus of attention of the teacher more toward how to motivate and improve learner learning performance. At the*
time of the TCT report submitted to the teacher, the teacher becomes aware that there is a problem in the mastery of competence which explains why the teaching performance is not optimal. (Karim, Teacher from East Kalimantan Province, Interview: April 11, 2016).

Wakhidul Karim’s remarks are in accordance with the statement of another teacher, Supriatin, who stated that:

When the government informs that there will be a competency test for all teachers, the teacher tries to prepare by reading relevant references. Discussions at the teacher community level are also conducted among teachers to discuss materials related to teacher competence. After the TCT is implemented, and the teacher receives a report showing the test results, the teacher then understands that there are competencies that must be mastered by the teacher according to established standards, which have not been mastered by the teacher. In the future, teachers who have not met the competency standards are required to attend training in improving the competence of teachers, the teachers follow well in the hope of improving the competence (Supriatin, Teacher/National Trainer from West Java Province, Interview: April 11, 2018).

In 2016, the government launched a follow-up policy on TCT results through the Learners’ Teacher Competency Enhancement Program (LTCEP) (Figure 4). The LTCEP is a learning activity for teachers through training in order to improve the ability and competence of teachers in performing professional duties. The upgrades include activities aimed at improving and growing abilities, attitude, and skills (Ministry of Education and Culture, 2016). From this activity is expected to produce a change of behavior of teacher which is real change of behavior have an impact on improving teacher performance in learning process in classroom.

Figure 4. LTCEP flow
Source: Directorate of Teachers and Education Personnel, 2016
The LTCEP is developed based on teacher competency standards before being used as a basis for the preparation of TCT questions. This is in line with the purpose of the learners’ teacher program which is oriented as a follow-up of TCT results. Based on the Competency Achievement Indicator (GPA) in Standard of Teacher Competency (STC), a teacher competency map is developed which is divided into 10 competency groups. Furthermore, from 10 groups of competencies, a module of learners’ teacher competency improvement is developed for each group of competencies. These modules will furthermore be used learning materials for teachers who have not yet achieved competence in the appropriate competence groups. The LTCEP is conducted through three modes i.e. the Facial Face, Online, and Combination of both.

1) Face-to-face Mode
   The face-to-face mode is for teachers who need a more intensive upgrading of competencies by studying 8–10 modules. In addition, to provide learning options for teachers who do not have enough choice due to various limitations, so it is not possible to follow other learning mode, for example due to geographical reasons, the lack of / lack of electricity and internet network, the availability of budget, information technology literacy and communication, as well as other rational reasons.

2) Online mode
   Online mode is for teachers who need to improve their competence by studying 3–5 modules. Online mode can be implemented by preparing a learning system that independently provide instruction and learning services to the participants without directly involving the teacher in the process of organizing. The instructional system includes the registration process, the implementation of learning, the final test, and the determination of the passing of the participants and the issuance of certificates. In some cases, the involvement of a capability is still required, e.g. in checking and assessing tasks that the system cannot yet implement, or to assist the participants in case of difficulties that the system has not been able to address.

3) Combination
   Combination mode is intended for teachers who require increased competence by studying 6–7 modules. Combination mode online is a mode that combines face to face with online. Facilitators on the one hand can be represented by a learning system consisting of firmware, brain-ware, and software; and participants on the other hand carry out the instructions given by the system, start registration, implementation of learning, up to evaluation. The involvement of mentors can be done in 2 (two) ways: (1) meet face to face with the participants; or (2) face to face virtually, either through video, audio, or text.

   If there are obstacles, then the 3 modes are not possible, teachers still have to improve their competence by doing self-learning. From the interviews, the feedback is very positive. The above TCT results-based training is considered as an appropriate strategy. This is revealed by the results of interviews with national speakers of training as follow:

   Training conducted in accordance with the need for teacher competency improvement, based on the results of TCT, can run more effectively, than in general training, conducted without an accurate basis. Teachers with conditions have not mastered the same competence, and then given the same training in accordance with the competence that still not meet the standard, make it easier also in the implementation of the lesson during the training.
Competencies that are taught are also more focused on certain competencies that seem to be lacking (Purnomo, National Trainer, interview: April 16, 2018).

Training by offline and online modules is an appropriate training strategy, especially for large targets and diversity of teacher abilities. This is stated by one respondent of this study, named Khikmawati, as follows.

Module-based training is a training strategy that is quite relevant to the needs. Teachers, who have not mastered certain competencies, are included in appropriate training, with the need for less competence, and facilitated learning through modules that contain materials that can improve competence. The broad range of competencies is not possible to teach all through training. Module-facilitated teachers can learn more independently about the competencies not taught during the training. Implementation of online training is also appropriate, especially to answer the needs of training that is mass. Online training constraints that are sometimes caused by ICT literacy can be overcome by a combined pattern, an online-offline combination. When offline, teachers are taught the training systems and applications used, as well as the general overview of the training, which teachers then study independently by utilizing prepared online modules. (Khikmawati, National Trainer, Interview: April 11, 2016).

Throughout the year 2016, the number of teachers who participated in the LTCEP is 427,189 or 15.82% of 2,699,516. The percentage of teachers’ participation in the 15.1% LTCEP does not yet describe the total teacher population, however, it provides a glimpse of the results of facilitation provided to teachers in the Learners’ Teacher Competency Enhancement Program. The average 2015 TCT Results with TCT 2016 can generally be illustrated in Table 6.

The distribution of TCT values for each level is shown in Table 7.

### Table 6
#### Average Score of TCT Year 2016

<table>
<thead>
<tr>
<th>Aspect</th>
<th>TCT 2015</th>
<th>TCT 2016</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Mean</td>
<td>39.48</td>
<td>64.92</td>
<td>25.44</td>
</tr>
<tr>
<td>Pedagogic Mean</td>
<td>41.87</td>
<td>63.79</td>
<td>21.91</td>
</tr>
<tr>
<td>Professional Mean</td>
<td>38.46</td>
<td>66.05</td>
<td>27.59</td>
</tr>
<tr>
<td>Participants</td>
<td>427,189</td>
<td>427,189</td>
<td></td>
</tr>
</tbody>
</table>

Source: Directorate of Teachers and Education Personnel, 2016

### Table 7
#### Distribution of TCT Score Year 2016

<table>
<thead>
<tr>
<th>Level</th>
<th>Participants</th>
<th>Person/Module</th>
<th>Mean 2015</th>
<th>Mean 2016</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>72,016</td>
<td>141,522</td>
<td>43.32</td>
<td>65.82</td>
<td>22.49</td>
</tr>
<tr>
<td>Primary School</td>
<td>219,207</td>
<td>432,416</td>
<td>40.17</td>
<td>63.80</td>
<td>23.63</td>
</tr>
<tr>
<td>Special School</td>
<td>3,310</td>
<td>6,602</td>
<td>40.82</td>
<td>66.79</td>
<td>25.97</td>
</tr>
<tr>
<td>Senior High School</td>
<td>85,390</td>
<td>170,155</td>
<td>35.46</td>
<td>65.33</td>
<td>29.87</td>
</tr>
<tr>
<td>Senior High School</td>
<td>27,847</td>
<td>47,151</td>
<td>38.07</td>
<td>66.66</td>
<td>28.59</td>
</tr>
<tr>
<td>Vocational High School</td>
<td>19,390</td>
<td>170,155</td>
<td>35.46</td>
<td>65.33</td>
<td>29.87</td>
</tr>
</tbody>
</table>

Source: Directorate of Teachers and Education Personnel, 2016
The results of the program learners’ teacher in 2016 then followed through the program continued in 2017. Currently the results of the program in 2017 are still being analyzed, as well as the preparation of the program continued in 2018. Sustained expected government targets that the year 2019 average Indonesian teacher competence to reach 8.0 can be achieved.

**Implications**

Discussion on the assessment of education is mostly done on the assessment of learning outcomes, while the assessment on the competence of teachers is still rarely done and discussed. This is noteworthy, because assessment of teachers is also important as part of their performance evaluation (OECD, 2009). Emphasis on competency-based training also increases the need for teacher competency assessments (Roelofs & Sanders, 2007, p. 124). The results of this assessment are also useful for the purposes of decision making in teacher coaching. Accountability in the teaching profession can also be obtained through assessments of teacher competence.

The effectiveness measurement of teacher performance is as important as the development of the teacher itself (Darling & Hammond, 2010, p. 12). Therefore, the perspective on the teacher should not be focused only on the learning achievement of learners, but also on mastering the competence by teachers. Not only students who need to be assessed learning outcomes, teachers also need to be measured mastery of the competencies that their provision of teaching in the classroom. If the competence of teachers is low, then the teacher may confront difficulty to provide educational services to students. If the results of the assessment show that students have not been able to master the competencies taught by the teacher, then the teacher performs certain steps to improve the student’s competence. Similarly, if the results of the assessment indicate that the mastery of their competence is low, it is necessary to improve the quality of teachers.

The policy to encourage teachers to become learners is a strategic step to encourage teachers to develop self-employment in a sustained manner. The development of sustained proficiency for each teacher demands the commitment of each teacher (Brine, 2005). The learners’ teacher program, which in essence encourages teachers to raise awareness and commitment to continue learning, becomes an appropriate vehicle for sustained teacher self-development. Learners’ teacher is a teacher who is committed to continuing to study as long as she devotes herself to education. Therefore, when a teacher decides to quit or does not want to learn, then at that time he stops being a teacher or educator.

The mapping teacher competence is important because teachers are one of the most dominant factors affecting the success of education. Hattie (2013, p. 3) shows that teachers are a dominant factor affecting student achievement. Teachers contribute 30% influence on student achievement and the rest student contributes 50%, home contributes 5–10%, school contributes 5–10%, peer effects contributes 5–10%, and principal contributes less than 5% as described in Figure 5.
This is in accordance with the opinion (Cobb & Hodge, 2002) which states that teachers are the most important source for developing a student’s mathematical identity. They influence the ways in which students’ think of themselves in the classroom (Anthony and Walshaw, 2009; Walshaw, 2004). Therefore, the success of learning mathematics school can be determined by the quality of mathematics teachers, both in terms of mastery of mathematical materials and teaching methods. How much the influence percentage of teachers on student achievement as seen in the Figure 6 above shows that programs that encourage teacher quality improvement should be considered as a serious concern. Accurate data is needed as a basis for the preparation of teacher quality improvement program so that the teacher really get the program service as needed. What competencies need to be improved from the teacher should be well identified, in which the low level of competency is the focus of teacher development. After implementing the TCT, the Indonesian government launched a teacher competency development program through the Learner Teacher Training Program in 2016. The follow-up of TCT through the learners’ teacher program implemented in the form of training is the right policy in improving teacher competence. The process of realizing a professional teacher can be done through training (Iswari, 2019, p. 111). Training is important for teachers in schools as a tool for professional development and to improve the knowledge and quality of teaching and learning for sustained education (Kabadyai, 2016, p. 12). Research Kunartinah and Sukoco (2010: 83) resulted in the finding that education and training have a positive and significant impact on competence. The research of Hasanah (2010: 85) show that the influence of teacher education and teacher training on teacher performance (X1 on Y) is 33%, while work climate factor on teacher performance (X2 on Y) is 67%. Simultaneously the educational factors and teacher leadership training with work climate (X1 and X2 on Y) is 57%. The results of this study show how great the contribution of training is in supporting the improvement of teacher performance. The Teachers’ Training Programs Learners are designed to be TCT-based outcomes and implemented as a follow-up to improving under-standard teacher competencies. Through the training is expected to produce teachers of learners, namely teachers who continue to learn and develop (upgrade) themselves at anytime and anywhere. The TCT follow-up policy, in improving teacher competence through training, is a very appropriate policy, in the context of accurate teacher-based development and development. In accordance with Silverman’s statement (2006: 21), many teacher training programs are not effective; this is because the training does not match the needs of teachers. After completion of the training, many teachers do not apply the results of the training, because the material learned in the training does not match the material needed for performance improvement.

Figure 5. Percentage of achievement variance students (Hatie, 2003)
Teacher Learners’ training focused on improving competencies in the still low is the right strategy. Training is not carried out equally for all teachers, but every teacher gets training according to the needs of which competence is still low. Suppose the teacher is still low mastery of his competence in the group of competence (CG) B as can be seen Figure 3, then the teacher is trained with the focus of training on improving the competence B. Similarly, teachers who are still low in CG F, the training followed by the teacher is a training that is focused on increasing the competence of GC F. Thus, the training that teachers participate becomes more targeted than the teacher should attend training that includes all competencies. The policy to encourage teachers to become learners is a strategic step to encourage teachers to develop self-employment in a sustained manner. The development of sustained professionals can encourage teachers to undertake lifelong learning, so that teachers can play the role of mentor responsible for sustained education (Wen & Wu, 2015). The development of sustained proficiency for each teacher demands the commitment of each teacher (Brine, 2005). The learners’ teacher program, which in essence encourages teachers to raise awareness and commitment to continue learning, becomes an appropriate vehicle for sustained teacher self-development. Learners’ teacher is a teacher who is committed to continuing to study as long as she devotes herself to education. Therefore, when a teacher decides to quit or does not want to learn, then at that time he stops being a teacher.

The teacher training with an enormous number of targets, such as in Indonesia with teachers to millions, is not a simple task. Complexity increases with Indonesia’s vast geographical conditions, spread over thousands of islands. It needs a specific strategy in formulating the training model and also in the implementation of the training itself. If not careful, not only will the training be ineffective, but also risk the need for enormous training funds. Therefore, a module-based training strategy implemented in various modes (online, face-to-face, and face-to-face-online integration) is an excellent training strategy. Most of the teacher trainings have only been done face-to-face, while online teacher training is relatively rare. Teachers training with very large and geographically scattered goals in different areas are difficult to rely solely on face-to-face training. In addition to the large costs, online training also requires a lot of effort in the implementation. Online and face-to-face online trainings are the right solutions for the condition. Web-based online training model provides convenience for customers who have limited time and difficult to reach the training location (Prasetyo & Gintoro, 2010). The ICTs can empower and help facilitate greater access to the development of sustained education for marginalized people (Makrakis & Kostoulas, 2012, p. 9). Thus, the training of learners’ teachers who also use the online way can cover how much the number of target teachers scattered throughout the territory of Indonesia.

The education for sustained development does not merely concentrate on providing knowledge, but also seeking solutions to everyday life situations (Briede, 2016, p. 34). This requires teachers to increase capacity in taking responsibility for strategic roles in the classroom. The continuing teacher, who continues to improve self-competence, becomes an important instrument for conducting learning in a quality classroom. Learning in this well-executed classroom will be the best vehicle for every student in improving the learning level. At the end, a new generation of more knowledgeable scientists will encourage better human life. The teacher faces new challenges and changes in education and is important for teachers to equip themselves with new knowledge and skills (Kabadayi, 2016: 12). Teachers are required to continue learning as well, because the teacher’s role
continues to grow, not only transmitting knowledge to the students, but also inspiring and guiding students as a learner (Bell, 2016, p. 52). Their role is to inspire and guide their students as learners. Education is not about filling a bucket but about lighting a fire. The awareness rising on the important role of teachers has implications for the higher demands on teacher quality. The use of teacher competency test results for the basic development of the teacher’s competence improvement program is a major breakthrough in the development and development of the teacher profession. During this time many teacher quality improvement programs implemented are based only on qualitative and speculative analysis of decision makers without being based on accurate data. Non-data-based teacher training programs are vulnerable to program non-conformity with real needs, so that programs implemented cannot deliver optimal results.

Conclusion

The teacher competence test in Indonesia is conducted on teachers throughout Indonesia, on all subjects, at all levels of schools, as a vehicle to obtain teacher competency map data. The tests are conducted online and offline using multiple choice tests, which are used to measure pedagogical and professional competence, according to teacher competency standards, which the government has set. The teacher competency test is an important breakthrough in: 1) mapping teacher competence with wide scope (nationally), and 2) utilization as the basis for determining teacher professional development program. The test result provides teacher competency profile, both nationally, regionally, and individual teacher, serve as the basis for preparation of teacher competency improvement program. Programs of teacher professional development which conducted based on the valid data is effective to encourage the Sustainable Profession Development. The Learners’ Teacher Competency Enhancement Program (LTCEP), in addition to improving the competence of teachers based on low competence on the competence profile of the competency test results that have been done, can also encourage teachers to be someone who continues to learn. A learners’ teacher is a prerequisite for the realization of a sustained educational system. Learners’ teacher continues to update the competencies according to the needs and development of science, so that students can facilitate creatively and be able to inspire every student to become a lifelong learner. The new generation generated by learners’ teachers is a sustained generation of sustained human development buffers.

References


Hattie, J. (2003). Teachers make a difference: What is the research evidence?. *Paper was presented in Australian Courcil for Educational Research Annual Conference on Building Teacher Quality, in University of Auckland.


Correspondence concerning this paper should be addressed to Tutut Herawan, Universitas Teknologi Yogyakarta, Kampus 1 Ring road utara, Jombor, Sleman, Yogyakarta, Indonesia 55285. Email: tututherawan@uny.ac.id
Contradictions in Higher Education

Laura Dzelzkalēja and Jānis Kapenieks (Sen.)
Riga Technical University, Riga, Latvia

Abstract

The present paper is a literature and experience summary about contradictions existing in higher education, nowadays. Thus, it is important to understand the underlying reasons and historical background to find ability to move towards higher education system for sustainability. Seven main contradiction groups have been distinguished and an overview is given in the article. The analysis is more focused on a situation in Latvia and the post-soviet space since the authors are well acquainted with the system. The main future research object is university mission, since from the mission statement analysis it has been found that low rated universities lack the distinction between education and training, having bigger stress on training, and that is growing into future problems and this situation interferes with the sustainable education goal.

Keywords: contradictions in higher education, conflicts in higher education, sustainable development, problems in university, university mission

Introduction and Background

Education has always been a topic of hot discussions, but in recent years topics concerning education have gained especially big attention because of the growing availability of new technologies, globalization and mobility (Rogers, 2000). These processes change the way we live, think and what we expect from the educational system and new professionals. This is the time of rapid changes and a truly big challenge for all of us. Renewed European Union Agenda on Higher education (EU, 2017) says, “Effective education and training systems are a foundation of fair, open and democratic societies and of sustained growth and employment. The EU’s ‘pillar of social rights’ and recent reflection paper on harnessing globalisation identify education and skills as a priority for European cooperation”. At the end of 2015, United Nations approved the 2030 Agenda for Sustainable Development (UN, 2015) to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” as one of their 17 global goals; educated society values are found in many of the 17 goals for our common sustainable future.

In Latvia, the school and high school (7–19 years old: 1st to 12th grade) education changes are mostly regulated at the state level, but it is not the same for universities (Bachelor, Master, Doctoral studies) which are mostly on their own with the pace of changes. The EU delivers the responsibility to the Member States: “Reform of higher
education is the responsibility of Member States and part of their efforts to develop world-class education and training. The EU can help Member States with their educational reform efforts” (EU, 2017), but EU will not do it for them. That means that the changes are happening slower and with bigger reluctance, because they have to come from within and without much of an external legal push. And this is always hard. On the other hand, this situation offers a more sustainable and long-term result since the changes that are happening and will happen are truly needed and we experience less feeling of having them forced from outside.

Sustainable education requires ecological management that values all components and participants in the system, seeks positive synergy, and is democratic and participative. In terms of learning and teaching, the goal is to create learning communities and organisations where functional, critical, and creative competencies are valued, where differential needs and learning styles are recognised and honoured, and where teachers and students are both learners and collaborators in the learning process (Sterling, 2001).

The contradictions and imbalance between the higher education (university level) and the world we live in has increased. Consequently, the biggest issue is that young graduates have not received education that is appropriate for the job market needs, and more importantly – appropriate to their skills and talents. Nevertheless, employers do not have an appropriate labour force. To achieve the sustainable future goal, we need, first, to identify the existing contradictions in higher education that contribute to widening this gap and, second, to think of solutions to these contradictions so that we can start talking about a wider system that consists of different stakeholders, such as universities, local communities, industry, policy makers, and their efficient interactions. It is due to the fact that our global problems are not a one-man or a one-institution problems.

In this paper, the main groups of contradictions in higher education are highlighted. It is done to help the university staff, policy makers and researchers gain some structure and insight in the main problems and propose some suggestions how to solve them. The main resources for this analysis are literature and the authors’ experience in the field.

Seven groups of contradictions have been distinguished as follow:

1) Willingness to teach comprehensively versus availability of financial resources;
2) Traditions versus novelties (in the educational process);
3) Willingness to learn versus willingness to financially survive;
4) Student X versus student Y (different backgrounds, personalities etc.);
5) “Women’s professions” versus “men’s professions”;
6) The mission of a higher education institution and
7) Graduate skills and knowledge versus skills and knowledge needed by the employer.

The following sections provide a deeper insight into higher education contradictions and present each distinctive group in detail.

1) Willingness to Teach Comprehensively versus Availability of Financial Resources

Interesting research was made by Okeke researchers group in 2017: The researchers followed a semi-structured interview approach to explore teachers’ broader understanding on causes of job dissatisfaction among them. Results indicated that lack of resources, overcrowded classes and lack of discipline among learners were serious sources of dissatisfaction among teachers. Administrative issues, lack of recognition by principals and parents for good work done also caused dissatisfaction among teachers.
in the study. It was also indicative that job dissatisfaction caused disengagement of some teachers with a consequential lack of focus on professional activities and being negative in their job (Okeke, 2017). The research showed that dissatisfaction caused disengagement which meant that it was very important to think and take into consideration teachers’ needs in order to increase the job quality and results.

Lecturers and professors often want to use modern facilities and technologies, but the holders of the financial resources do not consider it to be a priority or there are simply not enough resources, and money is not supplied for these purposes. In addition, it takes a lot of time to prepare for high level teaching (lecturing), to follow the novelties in the topic, to give consultations and feedback on the assignments. For example, in Latvia, however, lecturers and professors are commonly paid only for the lecture hours in the auditory and the salary is comparatively low: the minimum determined by the state law is 662 EUR a month for a lecturer in 2017 (724 EUR from 1st January 2018). Two years ago, it was only 602 EUR – the same as in 2009. This is lower than the average salary in the country, which is 838 EUR a month. OECD Director for Education and Skills A. Shcleicher says that salaries in educational sector in Latvia are low and many higher educational instances lack high quality faculty. Finance per student is also very low in Latvia, and for now the higher education and research live mainly on structure fund finance. The proposal of University Professors’ Association of Latvia is to allocate 2% of the state budget on higher education and to increase the study base finance, because now it is almost three times lower than an OECD average. The increase in budget would allow to increase the salaries and ensure qualitative teaching force (Diena, 2016; Rivža, 2016).

The low salary can be insufficient to cover daily expenses without a side work or working a double shift. As a result, lecturers can easily lose their enthusiasm and passion for teaching due to long working hours and exhaustion.

The big auditorium form of teaching is historically well known, but outdated, because students are not satisfied with passive sitting in the lectures to listen to facts, because they are a few mouse clicks away available for everyone (Gardiner, 1996). Often the limited resources lead to a limited number of lectures and a huge number of students. For example, in Kenya average lecturer/faculty proportion is 1:500; in some cases – even 1:900 (Wesangula, 2015). A research shows that the 100 world universities with the least student/faculty ratio are within the 600 best universities in the World University Rankings and none has more than nine students for every staff member (Minsky, 2016). It is important that a student/faculty ratio has an influence on learning efficiency.

In 1969, tenured and tenure-track positions made up approximately 78.3% of the faculty and non-tenure-track positions comprised about 21.7% (Schuster, 2006). In 2009 tenured and tenure-track faculty had declined to 33.5%, and 66.5% of faculty were ineligible for tenure (AFT, 2009). Of the nontenure-track positions, 18.8% were full-time and 47.7% were part-time (Kezar, 2013). Analysis of data from the National Centre for Education Statistics (NCES) and Integrated Postsecondary Education Data System (IPEDS) by the American Federation of Teachers (AFT, 2009) shows that between 1997 and 2007 tenure-track positions in the USA increased by 8.6%; full-time non-tenure-track positions grew by 38.2%; and part-time positions grew by 42%. Available IPEDS data from 2009 demonstrates a continuing decline in tenured and tenure-track positions from 34.5% in 2007 to 33.5% in 2009, offset by a 1% rise in part-time faculty. The AFT analysis did not include data from for-profit institutions, which are comprised
almost entirely of non-tenure-track positions (Kezar, 2013). And this problem is global, in Africa a lack of resources is especially visible, since in Kenya almost 50% of faculty work part time and teach at other universities, but this makes an impact on quality of the educational process. In Uganda, the low finance and the lack of staff have led to labour migration to better paid countries with less job load.

Although working conditions vary across the academy and even within a single institution, many faculty – particularly part-timers – are not permitted to contribute to curriculum planning and design, are often hired within days of the start of the semester (which impedes planning and preparation), are not provided with office space for office hours and other work, and do not receive support from administrative staff or resources to support instruction. Non-tenure-track (NTT) faculty often have little choice in the classes they teach, meaning they often teach outside their areas of specific expertise. These conditions are problematic, but so are inequitable compensation, job insecurity, the denial of healthcare benefits and retirement plans, exclusion from meaningful participation in governance and professional development, and lack of respect for non-tenure-track faculty from tenured faculty and administrators on many campuses. In the USA only, 22.6% of adjuncts receive any kind of health coverage from academic employers. Many adjuncts have to work multiple jobs in order to make enough money to subsist, which is a more-than-full load (Kezar, 2013).

In short, the combination of lack of time to prepare, lack of freedom, heavy workload and commuting between two or more jobs leave these faculty members with little time to bring their best work to the classroom. It is important to acknowledge that findings do not – or should not – implicate non-tenure-track faculty, as individuals, as being responsible for negative outcomes. In fact, research finds that these faculty, whose primary responsibility is to teach undergraduate students, are largely committed to teaching, student learning, and often bring useful professional and real-world experience to their work, enhancing the classroom experience (Edmonds, 2015; Kezar, 2013).

Research shows that increased reliance on NTT faculty, particularly part-time, has been found to negatively impact retention and graduation rates. In the research by Ehrenberg (2004) and Jaeger (2009) it can be seen that graduation rates decreased as proportionally to NTT faculty increase. Increase in part-time faculty has an even greater impact on graduation rates, as well as retention (Jacoby, 2006). Gross (2009) found that students at two-year colleges that had more full-time, tenured faculty were more likely to transfer to four-year institutions. They found a 4% increase in transfer to four-year institutions per 10% increase in the proportion of tenured faculty. Gross (2009) also found increased proportions of part-time faculty. In a study of college freshmen, Harrington (2001) found that increased exposure to part-time faculty was significantly associated with lower second-semester retention rates, lower grade points and fewer attempted credit hours. Bettinger (2010) found that early exposure to higher proportion to NTT faculty had a negative effect on students’ major selection. Most studies highlight the substantial effects of diminished interaction. Contact time and interaction between traditional faculty and students have been shown to foster student success; suggested an inverse relationship with regard to NTT faculty (Benjamin, 2003). Research suggests that the inaccessibility of part-time faculty to students due to time pressure, lack of office space, and holding jobs at multiple locations has an inverse, negative effect on student outcomes (CCSSE, 2009; Eagan, 2008; Jacoby, 2006).
In the situation where resources are always limited, there should be some new methods of blended learning or e-learning (Žuga, 2015) implemented to satisfy the new needs of digital age (Bates, 2015). Balancing the tradition with seeking something new is connected to the next group of contradictions.

2) Tradition versus Novelties (in the Educational Process)

Historical heritage is always with us, and we base our today on it, but we have to be able to change our perceptions and approaches in accordance with the demands of our century. There is a popular opinion that the students perceive the world in a different way than their lecturers – different experiences, different upbringing and different historical and social backgrounds. Moreover, we have heard a lot about digital natives and digital immigrants (Prensky, 2001). Thus, it seems that the youth should be taught with different methods and approaches. But there is also another opinion – that the perceptions about what the education should be like are formed by teaching staff: student’s attitudes are formed by the lecturer’s approach. Thus, a situation arises in which students integrate their perceptions in accordance with what they receive from lectures, even if the approaches are very traditional and with a very few interactive tools. Until they are acquainted with something better.

The need for change is well grounded but it would not be correct to ground it with the assumption that learning styles are changing (Margaryan, 2011), because it forms another way around – the world changes, so it seems that the faculty should be the first to embrace the changes and the changing learning styles are consequences. Furthermore, when the students know, that the learning process can be different, they can start to demand the changes. In a research study conducted in Russia, and the Russian educational process is historically close to the Latvian on, it was concluded that the most important prerequisite to improve the learning processes was improvement of lecturers’ pedagogical competences, and that it served as a core for every educational system (Dorozhkin, 2016).

Thus, it can be concluded that the main key to smoothen this group of contradictions is to educate lecturers. That would also contribute also to the formation of adequate student evaluation, assessment and feedback mechanisms that ideally should encourage student’s initiative and self-directed learning, and not only serve as tools for testing factual knowledge, forgetting about taking into consideration student’s self-progress evaluation, states of vulnerability and real problem solving skills (University of Reading, 2017). After all, students are subjects, not objects, they are living personalities and emerging professionals that deserve to be respected and treated with honour as human beings, the same as faculty.

3) Willingness to Learn versus Willingness to Financially Survive

In Latvia and in many other countries, this group of contradictions is topical. Students usually move to live in the city where their chosen university is located. Hence, if their parents are not wealthy enough to support them during the study time or the student does not want to be a burden for the parents any longer, a question emerges about financial resources for surviving during the study process. Usually, there are two opportunities: study loan, which is very small in Latvia and leads to having credit obligations in the future or finding paid job during the studies. If the choice is a job that very often means not being able to attend all the lectures and fulfilling all the independent and practical work in a good quality.
In Latvia, 51.1% of full-time students have a job, 12.8% say that they have some earnings time by time. 45% of the students who have paid jobs say that the job is a priority over studies. 31% of the students have mentioned that they are in a financial struggle regularly (E-klase, 2010). Research in Latvia shows that students, who pay university tuition fees, are more likely to have a job during the studies than those whose fees are subsidised by university (Researcher Group, 2007). A survey conducted in the United Kingdom by Endsleigh (2015) indicated that eight out of ten (77%) students were working part-time to help fund their studies; it was a serious growth to compared to 45% in 2013. 14% said they had full-time jobs either during term time, holidays or both. 63% of respondents said that they had a part-time job, with a third (33%) of students working part-time during term; while 14%, 13% in 2013, of those asked said that they held down full-time jobs (either during term-time, holidays or both). A research survey in United Kingdom showed that there were 59% of students working (Gil, 2014; Burr, 2015).

However, an increase in the number of working students has not led to a decrease in students’ dependence on other sources of finance, as might be expected. Endsleigh found that in 2014 53% (52% a year before) of students continued to depend on their parents to help them through university, 74% relied on their student loan (67% a year before and 60% two years before) as one of their main sources of income and 46% (25% a year before) of students used their overdraft to help make ends meet (Burr, 2015; Gil, 2014).

Most students are working, at least in part, because of money concerns, with 58% wanting to spend the money on socialising and 55% on food and household bills. A sensible 38% say they are doing it to save for the future and 35% – to avoid being in debt. More than half (57%) of students who work part-time spend their additional income on necessities – accommodation, food and household bills as well as earn extra cash for socialising (56%) (Burr, 2015). In Latvia, 78% of the surveyed working students do it to cover their daily expenditures (E-klase, 2010).

The research results, however, show that money concerns are not the only reason why students are increasingly choosing to seek out employment whilst at university. Many also do it to boost their employment prospects after university. Over half – 53% – say this is a motivating factor (Gil, 2014). For many students a practical job life experience is very important, but at Latvian universities these opportunities are poorly available: 25% of the students reprobate internship possibilities and management (E-klase, 2010). In the United Kingdom, 87% of the surveyed students say that developing additional skills and bulking up their CV are both important reasons for getting a job while studying (Burr, 2015). More than a half (52%) of the surveyed working students in Latvia work in their speciality, mostly in natural sciences, math, IT, health care and social welfare (E-klase, 2010).

It can be concluded that the real job experience is both valuable in terms of financial support for students and for gaining skills and experience that is not available or poorly available at a university. But there is another side of working while learning – a lack of focus and time for learning, so the studies can suffer a lot if students choose or are forced to choose the job over studies. There are universities that do not support their students to have a paid job. At Oxford University, “term-time employment is not permitted except under exceptional circumstances”, and even in the holidays students are told to prioritise their studies. Cambridge University similarly “does not allow students to undertake
paid work” while they are studying full-time, and students “should not expect to accrue additional income in this way” (Gil, 2014). On the other hand, the students have more time for studies; on the other hand, they may not have enough money to even be able to study. Thus, the higher education can become somewhat a privilege of the rich.

A solution to this contradiction could be a broader exploitation of e-learning opportunities, closer collaboration between industry and universities, and more agile study plans and promoting jobs with duties that are related to learning topics.

4) Student X versus Student Y (Different Backgrounds, Personalities etc.)

This contradiction has been always with us, but in the global society it has grown especially topical since the new trend is tolerance and not repression or hiding. Nowadays, in front of a university teaching staff, there is an auditorium of different genders, races and nationalities, as well as, different ages, knowledge levels, world perceptions and backgrounds, different learning styles and perception types, differing ability of self-directed learning and different emotional intelligence levels. Furthermore, the lecturers are also different, and the different students have to get accustomed with those different lecturers. And among this all, students have to learn the study subject.

In the research by Margayan (2011), there was not any evidence found on the popular idea about young people gaining radically new learning styles. From the research it seems that students are more likely to adapt to the lecturer’s style and demands. Thus, the lecturer has the great responsibility and duty to encourage creativity, self-motivation, and responsibility for student’s learning results with the help of learning orchestration.

On the other hand, it is also completely clear that different students do have different approaches to the learning process. For example, some studies state that learning styles differ between genders. One line of thought on why males are not doing as well at school points to a laddish culture where boys do not take school as seriously as girls; Some research puts it down to boys being taught predominantly by female teachers, especially in primary schools. However, another research maintains that gender of the teacher is not as important as the gender of the learner (Times, 2015). It means that using different methods according to the learner’s gender can result in better learning outcomes and are not restricted by the gender of the teacher.

Another very important topic in a multi-dimensional learning environment is an ability to manage emotions and know oneself. Salovey’s research group has termed Perceived Emotional Intelligence (PEI), or the knowledge individuals have about their own emotional abilities (Salovey, 2002). This scale addresses three key aspects of PEI: Attention conveys the degree to which individuals tend to observe and think about their feelings and moods; Clarity evaluates the tendency to discriminate between emotions and moods; Repair refers to the subject’s tendency to regulate his/her emotions (Fernandez-Berrocal, 2005). Lerner (2001) showed a general tendency for angry and happy individuals to seek risks and for fearful individuals to avoid them. Individuals that are aware of their emotional states are less likely to fall into a moment of weakness (Fernandez-Berrocal, 2005).

From this follows that in order for individuals to cross their borders into unknown and broaden their perspective, it is important to avoid fearful learning circumstances, so the teacher should be more of a mentor and motivator than “strong fist” that intimidates students – and this is what Dewey stated already a century ago (Dewey, 1913).
Anger in some proportion is engaged but can become dangerous and hard to control, so it seems that it should be mostly avoided in the learning process.

A welcoming and positive environment should be created to be able to engage the different experiences and contradictions in the auditory for the sake of the students, so they would learn how to evaluate their own and others’ advantages and setbacks and to divide learning tasks among themselves accordingly and understand, what to learn from each other. Sharing experiences would help develop this positive learning environment and decrease isolation from differences between each other, because isolation leads to fear and less sharing. Sharing is an important way to pass tacit knowledge (Jin-Feng, 2017; Young, 2012; Erden, 2008; Muthuveloo, 2017).

One of the latest trends for education for sustainability and life is the concept of mindfulness, given its potential to address both cognitive and affective processes and to stimulate reflection on the drivers of often routinised consumption practices. It is defined as the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude. Key competencies as learning objectives in education for sustainable consumption seek to (1) nurture cognitive, motivational and volitional dispositions, (2) are guided by the idea of critical, self-determined and self-reflexive individuals and (3) promote the capacity of learners to actively and responsibly contribute to advancing overall societal progress towards sustainability. Mindfulness is seen to encompass the reflection of individual values and actions in each given moment with a potential to strengthen people’s ability to deliberatively focus their mind in a way that they become more sensitive for their own values, emotions and ensuing actions (Stanszus, 2017). Thus, integration of mindfulness concept together with already widely spread sustainability concept throughout the education could lead to higher tolerance levels and more positive learning environment.

5) “Women’s Professions” versus “Men’s Professions”

Prejudice and historical heritage have deeply grounded in our consciousness. For example, math is traditionally considered something for boys and the girls have been taught to believe that they are not able to handle exact sciences (Times I., 2015). And similar division goes for many more disciples – like boys do not traditionally choose nurse profession, and teacher profession is also something that brings associations with women. A popular perception is that girls are more suitable for humanities, but boys – for exact sciences in spite that research does not justify this opinion.

All over the world, girls have relatively better grades. For example, in Ireland boys’ grades are lower and girls are winning more college places, but boys dominate in engineering. But once boys go to college, their academic performance begins to match that of girls. And this is where males start taking over, ultimately dominating the senior ranks of academia (Times, 2015). Often this fact is justified with the fact that in school there are more female teachers, but in universities – male.

But the male predominance does not stop at the university. A study made in the United Kingdom showed that females who were working during the term time at university earned 36% less than males. But men are more likely to cite future earning potential as a reason for taking a degree (Burr, 2015; DBIS, 2016). In Latvia, for example, there is a gender disproportion both regarding the speed of finding job and salary. Men tend to find job faster and they earn more as well – men’s salary is 1.34 times greater than
that of what women earns at the same conditions (Researcher Group, 2007). However, in the United Kingdom young male graduates are more likely to be unemployed than young female graduates. UK Graduate labour market statistics 2015 (DBIS, 2016) report found that among young graduates aged 21 to 30: 5.8% of male graduates were unemployed, 4.0% of female graduates were unemployed. And it is so in spite the fact that women actually are more educated than men – in 2014, in Latvia 69% of university or college graduates were women. At present, in Norway 60% of college/university students are women and the women’s share of those who graduate is even higher (Amundsen, 2015; Researcher Group, 2007).

There is a clearly visible tendency of profession choice differences between men and women. Historically, education, humanities and arts are more dominated by women, but exact sciences – mostly by men. Research conducted in the United Kingdom showed that male students were more likely to be interested in higher-paying areas such as IT, engineering and finance (DBIS, 2016). The most popular areas among males were: IT and telecommunications (23.1%), engineering and manufacturing (23.0%) and science (22.7%). The most popular areas among females were: healthcare (25.7%), science (20.6%) and teaching (20.0%). Only one in five who opts for studies in the health and social sciences in Norway is a man and just one in four who works toward a degree in teaching is male; on the other hand, only a third of those who study mathematics, natural sciences or technological fields are women. In Norway, the strongest imbalances are found among studies for degrees qualifying graduates to teach in kindergartens, preschools and elementary schools from grades one through seven, but less than ten percent of the students are men in veterinary studies, dentistry and nutrition. The best gender-balanced fields of study in Norway were in economics and administration: in 2014 these attracted 46% men and 54% women (Amundsen, 2015). In Latvia, the situation is similar – in 2012, in programmes related to education 92% of graduates were women, 66% of graduates were women in social sciences, business and law, but only 21% were women among engineer sciences, manufacturing and construction specialisations and 30% in nature sciences, math and IT specialisations (GFK, 2013). Van Tongeren-Alers et al. conducted a systematic review of the evidence for gender differences in speciality preference among university medical students: male students were more likely to be interested in surgery, while female students were more likely to be interested in gynaecology, paediatrics and general practice, and the research showed consistency across countries (Van Tongeren-Alers, 2014). No real changes have occurred in the past decade with regard to the unbalanced gender distribution amongst Norwegian students – the disproportion that was there in 2005 was just the same in 2015 (Amundsen, 2015).

Research conducted in Norway showed that a gender balance in student groups, or fields of study, was positive for the student environment and for the amount of knowledge they acquired. The studies on gender selections showed that traditional conceptions and stereotypes regarding fields of interest and work of boys and girls were still alive and kicking (Amundsen, 2015). Professionalism has no gender, so it needs to be taken into consideration that prejudices about gender in professions do not stimulate stable and sustainable economics. This situation is paradoxical and does not reflect the needs of the job market, for example, in Latvia the most demanded profession today is an IT specialist (GFK, 2013).
Given such pronounced gender differences in relation with a professional choice across countries, Van Tongeren-Alers (2014) raised a very important question on such a thing as real free choice of career: to what extent available career options are socially and culturally mediated by gender. Solving this issue, a crucial role should be given to school teachers as well academic staff of universities, since the teacher and lecturer can be the ones that encourage students regardless of the gender – the only gauge should be one’s abilities and performance.

Another aspect of this group of contradictions is antithesis of intellect and emotions, and usually women are associated with emotions and men – with intellect. But actually, both intellect and emotions are present in every human being, and there is evidence that students with high emotional intelligence perform better academically than those with low, as well as being better equipped for their professional careers (MO, 2009). It is important to point out the value of emotional intelligence development at universities, especially in exact and technical sciences and for men, since these are the groups that traditionally have considered the topic of emotions not very relevant. More holistic pedagogies are thus needed to increase the effectiveness of education. The previously discussed methods and concept of mindfulness could give a contribution to solving this imbalance (Stanszus, 2017).

6) The Mission of a Higher Education Institution

Technical and practical knowledge and skills for career preparation are important and necessary goals of higher education. However, the best outcomes of a college experience go well beyond this. They include development of the whole, thinking person, cultivation of creativity, maturation of social and cultural sensibilities, and even increased passion for life, learning and civic engagement of all sorts – what collectively might be called “life and citizenship knowledge” (Byrne, 2013).

Thus, it is essential to answer a question: “What is a university for?”. The answer should be: fostering knowledge and understanding for student’s own sake – beyond and outside the need of profession – and development of thinking, compassionate member of society that has skills and motivation to increase individual and societal wellbeing (Byrne, 2013).

To better understand the higher education mission, it is necessary to define a clear distinction between education and training. At the website of the 9th International Conference on Education, Training and Informatics: ICETI 2018 education is understood as cognitive development, but training – performance in a specific skill (ICETI, 2017). Thus, if an institution considers itself an educational institution, then there is a certain set of characteristics it has to meet, which reach far beyond the set of skills and knowledge needed to perform concrete and certain tasks.

If we want to understand the difference between education and training, it can be said that education is something broader than training, and training can be, and in many cases should be, an important part of education, but there should not be put a stress on the training as a main goal, because in such case it would eliminate the core of the education itself. There are many definitions for training and education. Some of them are summarised in Wheeler’s article (2013). There are a few more papers about the topic, for example, by Rickman (2004) and Remen (2015), but the essence is nicely formulated by Burrus (2016) – he says that “You train people for performance. You educate people for understanding”, and it is the core to keep in mind when thinking about higher education institution’s mission.
Table 1

Top 15 Universities According to Four Different Ratings

<table>
<thead>
<tr>
<th>Name of the university</th>
<th>Places in ratings</th>
<th>Average place</th>
<th>Summarised place</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 Best</td>
<td>Top QS</td>
<td>Webo</td>
</tr>
<tr>
<td>Stanford University</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Harvard College</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Massachusetts Institute of Technology</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>University of Cambridge (Berkley)</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Oxford University</td>
<td>10</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>9</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>University of California</td>
<td>4</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>Yale University</td>
<td>11</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>California Institute of Technology</td>
<td>7</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Cornell University</td>
<td>13</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>16</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>University College London</td>
<td>20</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>University on Columbia</td>
<td>8</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td>ETH Zurich</td>
<td>19</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>Imperial College London</td>
<td>22</td>
<td>8</td>
<td>56</td>
</tr>
</tbody>
</table>

To grasp the feeling about differences of world’s best and worst universities in their mission statements, and whether there are any, four popular ratings have been used: The Top universities ranking Top 1000 universities in the world 2018 (QS, 2017) that takes into consideration six parameters in different weights – academic reputation, employer reputation, faculty/student ratio, citations per faculty, international faculty ratio, international student ratio; The Times Higher Education World University Rankings 2018 (Times, 2017) on 1000 best universities in the world judging research-intensive universities across all of their core missions: teaching, research, knowledge transfer, industry income and international outlook; and The best schools rating 100 best universities in world today (100 Best Universities in World Today, 2017) which has taken into consideration academic prestige, scholarly excellence, and intellectual horsepower. The information about the worst performing universities were gained from only one rating, since all the other contained only a limited number of the best schools. The rating used for finding the worst performing universities is Webometrics Ranking of World Universities (Webometrics, 2017) with about 12 000 universities in their rating. There are about 20 000 universities in the world (RTU, 2017), but the Webometrics rating is the most complete to find in web freely. This rating was taken into consideration finding the best universities as well.

The fifteen best universities in the world at the moment, taking into consideration all the above-mentioned ratings, are as follows (1st place to 15th place chronologically):
13. University on Columbia; 14. ETH Zurich; 15. Imperial College London. The placements in the ratings and the summarised value for each of the mentioned universities can be seen in Table 1.

To give the feeling about different mission statements, here are a few examples:

The mission of Stanford University (this university is considered a top class university in most of the ratings) is to qualify its students for personal success, and direct usefulness in life; and to promote the public welfare by exercising an influence in behalf of humanity and civilization, teaching the blessings of liberty regulated by law, and inculcating love and reverence for the great principles of government as derived from the inalienable rights of man to life, liberty, and the pursuit of happiness (Stanford, 2017). It can be seen that the stress is on students’ personal development and success, as well as global (civilization) wellbeing mentioned and human rights and respect to values.

The mission of Cornell University (which is among 20 best universities in the world) is to discover, preserve, and disseminate knowledge, produce creative work and promote a culture of broad inquiry throughout and beyond the Cornell community, through public service, to enhance the lives and livelihoods of the students, the people of New York, and others around the world (Cornell). In this case we see some words about increasing life quality for students and a bit cosmopolite way of thinking – to improve the global society.

The mission of Westminster University in Great Britain (this university is among 601\textsuperscript{th}–800\textsuperscript{th} place in the world according to Times rating) is to shape the future of professional life by being a diverse, vibrant and inspirational learning environment; building the university as the leading practice-informed teaching and research; being a responsive, metropolitan and cosmopolitan university serving the needs of diverse communities; and embedding internationalisation, employability and green-thinking in all that they do (Westminster). It seems though, that this mission is too general, although the main focus point is considered to be movement towards meeting the needs of multifaceted society – in other words, serving the society.

The mission of Riga Technical University in Latvia (which is among 800\textsuperscript{th}–1000\textsuperscript{th} place in the world according to Times rating) is to ensure internationally competitive high quality scientific research, tertiary education, technology transfer and innovation for the Latvian national economy and society (RTU2, 2017). In this case, stress is put more on the quality for better chances in competition battle, which is narrowly targeted for development of Latvia and it lacks human and self-development in the centre of the education system.

The mission of the VIT University in India (which is also among 800\textsuperscript{th}–1000\textsuperscript{th} place in the world) is to create able management professionals who shall contribute towards the betterment of the society and nation through their dedicated staff and world class management education (VITUI, 2017). It is a good example of mission for reaching training goals and not so much educational goals. It also lacks human – subject attitude and prevails human – object attitude.

As we can understand from the examples, the definition and view in the contemporary literature about the mission of a university can greatly differ from the mission perceived by the university head and developers of the university’s positioning. The mission statements varied a lot, but there was a correlation found that best universities tended
to speak more about student’s self-development, creativity and tackling global challenges
and problems as well as serving the global community, while worst performing universities
tended to talk about creating and making professionals, sometimes, even using the word
“train” in their mission statement, stressing the excellence, research, innovation, practical
skills and solving real life problems, as well as serving the nation and local community.
What is interesting, the best schools rarely mention excellence, research and innovation
in their mission statements. Another thing spotted regarding the universities’ mission is
that often the worst performing universities had low quality web pages and often it was
impossible to find their mission statement. Overall conclusion is that the best universities
in the world focus more on the core of the word ‘education’.

The analysed worst universities focus more on what suits the word ‘training’ better.
Educational establishments are rightly and necessarily engaged in training, but it is not
even enough to pour information into receptive minds to meet the ideals of education. Partly
it can be explained by the economic and historical background where job market demands
skilled professionals for certain job tasks and less are needed critically thinking, reasonable
and self-aware individuals. But this should change very soon because the skilled profes-
sionals (trained individuals) can soon encounter big problems in finding jobs since the
jobs with a low cognitive load but a need for a great precision and speed are more and
more given to robots and artificial intelligence. We need skills and information, but we
also need – and this is of paramount importance – human beings who have learned to
think, make judgments, appreciate the beautiful and the good. We need not only experts
in choosing means, but people educated to decide on their goals. Thus, to replace educa-
tion by training is to threaten the human future (Rickman, 2004). And it seems that
the only way to prepare majority of people for wellness in the future long term, that is,
to make a sustainable future, is to educate them instead of concentrating mostly on
training.

It should be remembered as well that the used ratings and tops in this analysis are
using a set of criteria for evaluating the universities. Unfortunately, these criteria lack
comprehensiveness. Usually the criteria include such characteristics as number of citations
and other research outcomes, degree of international cooperation, openness and infra-
structure, but lack such measurements and students’ feelings during the studies, graduate
performance in the job market and readiness for real life challenges, readiness to tackle
difficult problem situations, graduate overall wellbeing etc. Thus, many very important
topics are not usually even considered in these ratings. They probably do not reflect the
reality. And another issue with this is a notion that the above-mentioned that is not con-
sidered in the ratings are not gathered at all by the universities – it seems that this kind
of information is not relevant to most of the universities, and that also reflects our way
of thinking and values.

Another threat with university ratings is that universities are willing to step up the
rating ladder and thus they may change their university policies according to the valuable
characteristics in the ratings thus trying to achieve high results in the characteristics
mentioned in the ratings but not paying much attention to the characteristics that are
not taken into consideration in the ratings.

According to Sterling (2001), education for sustainability is a means and process
by which we educate citizens in how to achieve global and local sustainable communities.
It challenges the dominant material, ecological, psychological, economic, and social
Contradictions in Higher Education

paradigms that define our culture and have led to our current impasse and threatened presence on this planet. Thus, we can see the linkage to the word “education” itself (instead of training) in a way that “education” if it truly reflects the deepest meaning of this word is actually “education for sustainability” since education should be the key to creating critically thinking and socially responsible person that is not afraid and ready to tackle the global problems that we face every day and will face in future.

7) Graduate Skills and Knowledge versus Skills and Knowledge Needed by the Employer

We have come to the last group of contradictions, which is more of a logical next step of summarising all of the other groups of contradictions since they all end up in this group – the knowledge and gained skills and competences and suitability to “real life”.

Research shows that >63% of the graduates lack the skills that are needed in the job market, in Tanzania it is >61%, in Burundi and in Ruanda 55% and 52%, respectively, but in Kenya – 51% are considered unsuitable for job market; in India in ~50% of graduates are deemed ‘unemployable’, in some industries even more – 75% in the IT sector, 55% in manufacturing, 55% in healthcare and 50% in banking and insurance (Wesangula, 2015; Mishra, 2015). Graduates of agriculture, humanities and arts often have no work experience and they are less likely to find a job – the unemployment rates are comparably higher. In 2006, in Latvia 8% of university graduates were unemployed, mostly due to family issues or continuing studies (Researcher Group, 2007). In India, most of the graduates are generalists with broad socio-economic knowledge but no specific technical skills; Spain, for example, is lacking language skills (Mishra, 2014; Corominas, 2010).

The reasons for graduates not being ready for the job market demands are various. Let us begin with the fact that often the study directions that correspond to students’ personal needs and talents are not in alliance with the country’s defined development and growth directions. For example, almost 50% of youth respondents in India said they would like to work outside growth sectors (Mishra, 2014). In Latvia, the situation is better – about 73% of the graduates work according to their education. It is quite a good proportion. Experts say that working in another field than education area is not always a bad thing – it can show a graduate’s ability to learn new skills and adapt to new market needs (Researcher Group, 2007), but it still means that more than a quarter of graduates in Latvia have chosen their profession wrongly. And this probably means that the procedure of setting sectors for growth – from external, in global research based to internal – in the country’s people talents and passion based. This would be harder and demand to broaden the information about children’s talents and drives, but in the end it would likely make the society happier, more creative and functional. It seems that such a society is the goal that most of the countries reach for.

After the talents and drives are identified, the talents can be adapted and directed into suitable sectors and make the national and regional strategies according to the talents today’s children have, so that when they are grown-ups, they could fully utilise their potential. This step would also solve the problem of youth in need of choosing the future profession when they are not aware of their strengths and weaknesses, talents and drives as well as are not fully informed about diversity of professions and what is hidden under the names of the professions.

Universities have faced flak in recent years over inflexible curricula, rote teaching and learning and lack of experiential learning outside the classroom. However, academics
say that industry expectations are often unrealistic and misguided. Employers want everyone to come prepared and ready, but they should invest in their own employees (Mishra, 2014). To decrease the dissonance between industry and the higher education institutions, for example, in India there are regional “knowledge centres” made to promote the collaboration between them in making curricula, teacher trainings, students’ exchange and international communications; students are to work for real projects in industry for practical skills. The Indian government is making a market information system to map the supply and demand (Mishra, 2014). Competency based approach is one of the ways to harmonise education with job market (Dorozhkin, 2016). Distance education and blended education could have a good impact on the situation; however, the creation of system of distance education should not be the final step for higher education institutions as such; furthermore, this process would not be developed without students (Vasilevska, 2017).

Conclusions

From all the literature and research on this topic, it has crystalised that the only way we are going to create education for sustainability is by really putting a human in the centre. Not just in words, but in real actions – by caring, accepting, by cherishing the great spectrum of differences among us all within this one humanity, and letting everyone develop oneself, reach awareness about individual talents, drives and passions as well as about weaknesses and personal breaks through the education. This self-awareness would then lead to awareness and caring for the person beside – an emotional intelligence that allows everyone to feel self-worthy and thus be able to appreciate and respect others as equally worthy – without feeling threatened.

The other big pillar that is crucial for our common success is quite the opposite – feeling of being a part of and feeling responsibility for the whole and consequentially – other “parts” as well. Teaching the cosmopolite way of thinking is more crucial now than ever since the world is connected more than ever through mobility, markets, digitalization and climate issues. Consequentially, one-city or even one-nation in the centre attitude is not suitable for era, since we are facing global challenges more and more, and they can only be tackled jointly and with this global perspective in mind. Too much time has passed since one nation could grow thanks to exploiting the others. Although it still happens, it is clear that this approach resembles sawing off the branch you are sitting on since the pollution, refugee problems, unpredictable economic systems etc. just harm everyone. The only way to deal with this outdated imperialistic way of thinking is to replace it with a cosmopolite way of thinking – an Earth inhabitant in front of all the other roles.

If combining these two pillars we get a colourful and diverse global population that strives for common good putting their effort and drive in the fields and topics they are good at and passionate about at the same time recognising and valuing the differences in other. And naturally questions would disappear about a lack of national and cultural awareness, environment awareness and other kind of awareness which lead to conflicts and problems.

There is still much work to do to implement sustainable and future challenges tackling education system, but at least the main directions are highlighted in many studies and
literature. There are problems in higher education since it is more or less going in the non-sustainable education direction. It is important to structure and name the reasons that have led and are still leading to this situation, and it is important to understand what the ideal situation is to be able to define the level of quality in a higher education institution. The contradictions defined and characterised in the article are an attempt to highlight the reasons for this non-sustainable education road in higher education institutions as well as share some ideas from research and experience on how an ideal situation would look like and why these defined contradictions are to be solved to be able to move towards education for sustainability and life in our society.

As to referring to the present article, the most interesting future research topic in the field of changing higher education would be university mission, responsibilities and role. Further deeper quantitative and qualitative analysis would be needed to better understand the correlation between university’s mission and performance.

One direction on how to contribute to solving the above-mentioned contradictions could be a wider e-learning introduction in the universities. It could only partly substitute the class lectures to maintain the social bonds and interactions meaningful at the same time using the class meetings for exactly this – working both with the course agenda and the social skills growing tolerance for other opinions and backgrounds, which would have to be designed to target the forth and fifths contradiction. The distant learning approach would also contribute to solving the third contradiction since the number of class lectures decreases and the learning time can be very agile due a to possibility to learn online at a convenient time for the student, thus allowing the student to combine work with studies more successfully. The online learning would also save some financial resources for the university since there would be less class lectures needed and so the resources could go to raise quality instead of quantity, lessen the work load for lecturers and increase the hourly rate thereby lowering the impact of the first contradiction on the quality of study process. At the same time, online learning is also growing very rapidly and it seems that universities that ignore this form of teaching and learning can fall behind and get stuck in the first contradiction, since the world is moving and changing very rapidly and agility especially in the higher education is getting a great importance. Another important and meaningful contribution would be related to the 4th and 5th groups of contradictions in a sense that online learning platforms allow making great self-tracking tools and allow a student to follow his/her own learning progress, develop self-awareness in one’s learning process and get to know one’s learning habits better. If the online courses are developed well and meaningful class meetings take place as well, it would seem that the overall learning quality could increase and, thus, also the graduates would be equipped with better skills and knowledge that would contribute to solving the seventh group of contradictions.

Acknowledgement

Thanks to the professor A. Baldiņš for suggesting and inspiring the present research. The research has been supported by a grant from the European Regional Development Fund (ERFD/ERAF) project “Technology Enhanced Learning E-ecosystem with Stochastic Interdependences – TELECI”, Project No.1.1.1.1./16/A/154.
References


GFK. (2013). *Sabiedrības priekšstatī par sieviešu un vīriešu lomām, dzimumu lidztiesību*. Riga: GFK.


development-professionals-network/2015/jul/29/kenyas-shuttling-lecturers-university-shortages-are-taking-toll

Correspondence concerning this paper should be addressed to Laura Dzelzkaleja, Riga Technical University, Kronvalda 1, Riga, Latvija, LV1010. Email: laura.dzelzkaleja@gmail.com
Blockchain and the Future of Digital Learning
Credential Assessment and Management

Merija Jirgensons and Jānis Kapienieks
Riga Technical University, Riga, Latvia

Abstract
Blockchain educational technology has created assessment and management tools for learner credentials that are permanent, transparent and sustainable while giving users direct access. Personal encrypted credentials enable users to shape lifelong learning pathways and personalize education according to individual values and needs. They allow for the permanent documentation of both formal and informal learning based on transversal competencies, adjustable across the economic sector and responsive to situational needs. Badging was the initial response to online credentialing. Mozilla’s open digital badges have become the unofficial global standard and the specifications remain free. They may be viewed in e-portfolios and social networks. Yet, if issuers cease hosting badges, they become invalid even when authentic. Some experiments with blockchain technology remedy this situation by creating a permanent, secure and sustainable infrastructure for learning records. The MIT Media Lab has produced the bitcoin based Blockcerts; whereas the Knowledge Institute, Open University, UK has developed Ethereum’s Smart Contracts to document Microcredentials (Badges). Both are Open Source products. Most EU nations are experimenting with educational blockchain. The technology creates an infrastructure to document, store and manage credentials and provides learners with a sustainable record of achievements they can control. It also benefits universities by reducing administrative costs and bureaucracy.

Keywords: Open digital badges, Microcredentials, blockchain, Blockcerts, smart contracts

Introduction
The traditional transcript is being challenged. It has been found as too limited, i.e., a paper record of courses taken affixed with a letter or number grade. The missing elements include a description of the skills achieved, mastery level, and extra-curricular activities contributing to the student’s development, such as voluntary service, internships and study-abroad. Personal factors such as creativity, motivation or leadership potential are also missing – factors that may give a fuller picture of students’ achievements and potential. Most significantly, learners cannot directly access their credentials but must depend upon third parties, often a university or former employers. If these organisations...
or individuals cease hosting the credentials; they become invalid or orphaned even when the credentials are still authentic. Added to the problems is slow turn-about time. The verification process for traditional paper transcripts is slow and may take weeks from the time of the original request is made to the time the requesting agent receives them. It seems counterproductive that in our information age where there appear a continuous stream of innovations every day that require continuous skills update and learning has indeed become lifelong, transcript validations should be such a slow and cumbersome process. A transcript therefore cannot be a closed archive, as now is the case, but a continuous record of achievements to which teachers, tutors or other experts may add throughout a learner’s lifetime. In an effort to speed-up credential validation, some universities are relying on pdf format transcripts appended with electronic signatures. But the method is vulnerable to forgery, and therefore not fully trustworthy as authentic (AACRAO 2016, May 31). In our digital age, it would make sense to have immediate access to credentials, and that they be encrypted similar to online banking with potential for records update according to need. Online banking has been around for decades, why not encrypted learner credentials? Many top ranking universities have responded to this need by recognising that new metrics are required to evaluate student ongoing learning. Recognising the limits of the traditional transcript in December 2016, fifteen registrars met at the University of Michigan to discuss ways to modernise the traditional transcript (Gnagey, 2017). At the conference, the consensus was that the learning record needed to be digitalised and designed to integrate and update continuous learning and skills. One of the presenters recommended an application of blockchain technology that could host badges, certificates, transcripts and diplomas. It would work by stringing together these diverse credential records (blocks) into a chronological order (chain). The presenter claimed that the validated records would be secure. It was adapted from the bitcoin blockchain although in order to control the documentation the university created its own cryptography (Gnagey, 2017); (AACRAO 2016, May 31). Moreover, the universities would benefit: it is a way of cutting administrative costs and bureaucratic procedures while adding security to the maintenance of student records (Matthews, 2017).

These educational trends express the holistic aims of Education for Sustainable Development (ESD). Today in the EU nations, educational reform addresses those skills and competencies that match the needs of the modern economy which are fully in line with the mandates of the European Qualifications Framework (EQF) (Recommendations of the European Parliament, 2008). These skills and competencies are also transversal; they are suited to a particular sector or situation; yet can be transferred and adjusted across the economic sector. Transversal skills may be university based or follow alternative pathways, but the process is lifelong. The personal element is important and involves personal wellbeing, autonomy, effective communication and constructive interpersonal relations. These skills and competencies are a high priority for ESD and are the cornerstone of educational reform in Latvia in accordance with EQF mandates. Initiating blockchain in Latvia – a developing well underway in Estonia – would allow learners to collect competencies and achievements garnered lifelong in an environment that is secure, transparent, and permanent with direct user access.
European Educational Experiments with Blockchain Technology

Blockchain is the dynamic new technology that was introduced with bitcoin in 2009 and since that time, it has received wider application. Banks, who first felt the competition, adapted it to finance. In reality blockchain is not a new technology, but a rearrangement of existing technologies deployed in a new way. Bitcoin was adapted to educational requirements at MIT’s Media Lab that created Blockcerts – a mobile app for educational credentialing. Another important blockchain is Ethereum that was developed from another cryptocurrency Ether launched in 2014 (Halpern, 2018). It is really a simplification of bitcoin and represents the second generation blockchain technologies (Gupta, 2017, February 28). It is a simpler system and was intended to allow business transactions with “smart contracts” – although critics claim that “smart contracts” can lack smarts (Derousseau, 2017). No doubt, the system needs improvement. Ethereum has been used in various fields, including finance, law, government and more recently education. It may be used together with other technologies. The Europeans, especially in the UK, have preferred Ethereum; while the Americans have opted for the bitcoin blockchain. Americans have generally viewed blockchain technology with greater scepticism than the Europeans, except in the field of finance. Other blockchains have appeared, but they are adaptions of one or the other of these technologies designed to match organisational needs. Many of the big name IT corporations are actively developing blockchain technologies: Microsoft (Azure), Intel, IBM, and many start-ups that are growing apace. Yet the biggest technology monopolies in the United States Apple, Amazon, Facebook and Google have been critical of blockchain (Maney, 2017). Yet they are potentially the most vulnerable to disruption by the technology. Google, however, with Deep Mind (its artificial intelligence lab) has viewed blockchain with ambivalence.

Blockchain is a decentralised ledger, like an old fashioned account book only adjusted to computer specifications that can send files or “blocks of information” to all participating computer “nodes” in a common activity, bitcoin, banking or e-government. Because blockchain is a decentralized system where information is distributed over a number of computers (nodes), it is harder to hack than centralized networks because each node receives the same information and any tampering is transparent to all nodes. Moreover, information once entered is permanent. Each block is identified with a hashtag that is signed and dated. Once information is entered into the blockchain, it cannot be changed or removed. If a correction is entered, it appears next to the original entry. Therefore, the issues of correction and update still need to be addressed. To facilitate retrieval, the blockchain system employs the Merkle Tree that is the root hash of a tree structure and serves as an indexing tool to verify specific transactions without need to retrieve the entire blockchain. Most simply put, the Merkle tree is a “hash of other hashes” (Grech & Camilleri, 2017, p. 94). While it is possible to develop blockchains without Merkle trees, a blockchain without these “binary hash trees” would make verification a cumbersome process and lead to many “orphaned blocks.” Most blockchain developers today include the Merkle Tree (Merkle Tree, n.d.). Merkle trees are not easy to navigate and the technology will need to be revised for improved usability.

More recently blockchain has been adopted by educational institutions. A few adventurous universities are experimenting with the technology. There are advantages for universities: besides the cost cutting and increased security issues already noted, universities would not need to act as credential gatekeepers for student populations
that are becoming increasingly peripatetic (Matthews, 2017). Moreover, there is a growing demand for skills update that is really making learning lifelong that requires permanent, verified documentation.

In Europe, UK’s Open University Knowledge Media Institute (KMI) is one of the pioneering universities to employ blockchain. KMI has created an Ethereum based blockchain platform: OpenBlockChain for academic applications partnered with British Telecommunications (BT). KMI’s priority is the students of the UK. The institute is conducting experiments with Microcredentials (badges) for courses available on the Open Learn website and MOOCs (UK platform FutureLearn). The Microcredentials are documented by smart contracts that are signed and give details of how and when the badge was earned, such as Security Assertion, Recipient, Issuer, criteria applied and evidence of accomplishment. Samples of the students work may be added. The contract then is embedded and becomes part of the blockchain (Domingue n.d., Video) (Appendix A). Additionally, there is an international strategy employed by KMI. The Media Institute is developing collaborative networks that include KMI, JISC (the UK based non-profit educational digital organisation), the University of Southampton, BT, and the University of Texas, Austin creating a core global outreach community (Grech & Camilleri, 2017, p. 64). Moreover, KMI Director John Domingue argues that block-chained Microcredentials have a special role to play in Africa and other developing nations where students have limited opportunities to study abroad and with available online courses are able to collect academic credentials. Blockcerts, the mobile app for credentials storage developed by MIT is currently unavailable for Ethereum. It is, however, under development (Blockcerts, 2017) and will be further discussed in the section analysing MIT’s experience with blockchain.

Most states in the EU are planning blockchain strategies to fit national agendas, and most employ the Ethereum blockchain. Education is a priority in all EU countries, and some interesting experiments are being developed (Inamorato dos Santos, 2017). Some examples are discussed below. Estonia is touted as “the blockchain” nation and recently Fortune magazine gushed “if you want to see the future, go to Estonia (Walt, 2017). In reaction to the 2007 cyber-attack, nearly all public services are blockchained; these included: e-Voting, e-Tax Board, e-Business, e-Banking, e-School, and e-health. An innovation is e-residency, where a company may register its business in Estonia by paying a 145 Euro fee to gain access to the EU market (Korjus, 2017). But Estonia is no tax haven; its e-citizens are expected to pay taxes in their country of citizenship. Estonians access their e-services by digital identifiers, a string of eleven numbers to which they are assigned at birth. The security technology is the Keyless Signature Infrastructure (KSI) that safeguards all public data. There are no paper originals and signatures are almost exclusively electronic. In 2018 Estonia planned to open a “data embassy” in Luxembourg that will hold backups for all of Estonian data. It has the only NATO accredited cyber-defense centre in Europe (Walt, 2017). And yet, it seems odd that in this thoroughly digitalised nation, credentials and university certificates are not digitalised. However, a national qualifications database is currently being planned in which all Estonian universities will participate. The system will be interactive with all job applications; university graduates’ CVs will be matched to potential employers (Grech & Camilleri, 2017, p. 85).

The Netherlands is in the planning stage about blockchain implementation. It has created the Dutch Blockchain Commission that involves 20 organisations drawn from
the logistics, energy and financial sectors, as well as government and research institutes. They hope that from this seedbed a blockchain infrastructure can develop that is secure, trustworthy, and reliable. Eventually, the Dutch hope to become leaders in the development and application of blockchain technology, but their approach is gradual; they want to test and evaluate blockchain development at each step, making modifications as needed. The Dutch gradualist approach contrasts to Estonia’s radical model (Grech & Camilleri, 2017, p. 88). But rapid change in Estonia was galvanised by the country’s lack of infrastructure in 1991 when the Soviet Union collapsed and further accelerated by the 2007 cyber-attack.

On the periphery of the EU on the island nations of Cyprus and Malta some innovative blockchain strategies are being introduced. The University of Nicosia (UNIC) in Cyprus is the only university to date that provides full blockchain credentials, including all certificates and diplomas. The university boasts of being #1 in the world for blockchain education (UNIC, 2017). Moreover, it is accepting bitcoin (bitpay) for application fees and tuition payments (UNIC, n.d.). It seems only natural that the university offers courses in cryptocurrencies. UNIC is part of the Blockcerts consortium initiated by the MIT Media Lab – its relationship to MIT dates back to 2015 (Grech & Camilleri, 2017, p. 71). But UNIC uses a variety of tools to improve its system and has designed a strategy to foster its own unique brand.

On the archipelago of Malta another EU nation is employing the MIT developed technology Blockcerts. In January 2017 the Maltese Ministry for Education and Employment (MEDE) signed a contract with Learning Machine (LM), MIT Media Lab’s partner, to implement a pilot project for learner and worker owned records (Learning Machine Blog, 2017). Learning Machine’s vision matches the Groningen Declaration of 2017 whose mission is to promote the portability of global citizens’ skills across borders by sharing authentic educational credentials with whomever they want, whenever they want, wherever they are (Groningen Declaration, n.d.). Something of this vision seems reflected in the Malta project. LM together with the Malta College for Arts Science and Technology (MCAST) plans to design digital diploma templates that can be independently verified as authentic. They will also develop training certificate templates with the local Institute for Tourism. Another innovation at Malta is the workplace equivalency certificate that would give workers official recognition for demonstrated skills even if they do not possess university credentials. The pilot will be studied for its potential for deployment in e-government services such as health care, land registry, vital records, notary and law, drivers’ licenses and e-Democracy (Grech & Camilleri, 2017, pp. 76–78). It is an ambitious program and covers most of Malta’s infrastructure.

**Blockcerts at MIT**

In the United States, only the MIT Media Lab has developed a full-scale blockchain education credentialing system. It is using the bitcoin software platform rather than Ethereum because the team at the Media Lab regards it as the more powerful technology and views Ethereum rather condescendingly. The Media Lab’s team also feels that because bitcoin is associated with robust financial investment, it has a better chance of survival (Nazaré, Duffy, & Schmidt, 2016). In 2015 an incubator project at MIT Media Lab produced Blockcerts, a digital mobile app for delivering electronic certificates of achievement (Appendix B). The Media Lab collaborated with Learning Machine (LM), a Cam-
bridge, MA based Software Company. In 2015, the Media Lab produced its first block-
certificate issued to the Director’s Fellows, an international group of IT innovators
(Schmidt, 2015). Over the years, the MIT partnership with LM has grown. In June
2017, MIT issued diplomas secured by blockchain technology to two groups of students
in MIT’s Media Arts and Sciences and the Sloan School of Business (Grech & Camilleri,
2017, p. 73). The graduating students had the option to receive their diplomas with the
mobile app Blockcerts in addition to the traditional hard diploma (Wilmoth, 2017).

MIT uses the blockchain wallet for storing Blockcerts. Arguably, it solves the problem
of the public / private keys that are needed for secure bitcoin blockchain transactions
and can be confusing to users. After the wallet has been downloaded, algorithms automati-
cally generate the public / private key combinations which are a series of digital codes.
The private key is used to generate the user’s cryptographic signature (really a digital
ID) needed to verify each transaction. Now the Blockcerts wallet is available on Apple’s
iTunes and Google Play, but not the Blockcert itself that is issued by the university. Next,
the student sends the public key to MIT that makes a digital record of it and returns a
hash string of numbers to the student as verification of the authenticity of the diploma.
The diploma itself is sent later by e-mail as a JSON file (JavaScript Object Notation file)
on which the student’s public key information is inscribed. The private key in the student’s
possession verifies the authenticity of the diploma. However, an employer or another
university may seek to further verify the authenticity of the diploma by checking the
MIT verification portal by entering the certificate’s URL (Durant & Trachy 2017).
Verification is sent almost immediately. The portal also lists contact information, giving
a phone number and e-mail address for further information (Massachusetts Institute of
Technology, n.d.). These measures double the authenticity assurance of the diploma.
MIT plans to study and learn from its pilot blockchain projects and from the feedback
it receives from the graduating students of 2018 to further develop and deploy the
technology (Grech & Camilleri, 2017, p. 74). MIT already has available eTranscripts,
but there are forgery and hosting issues that have already been noted.

Philipp Schmidt, director of MIT Media Lab, has been an active promoter of block-
certificate technology for education. As Schmidt claims, Blockchain and cryptography can
now provide the technical infrastructure that would allow for the storage and secure
management and distribution of digital credentials (Schmidt, 2015). It puts users in
control of their achievements without needing to resort to third parties, most often
universities and sometimes former employers, for hosting, validation and reputation.
And faking of the blockchained records is more difficult than with the existing paper
system. Moreover, the system can accommodate all kinds of document formats (PDF,
XML, DOC, etc.) (AACRAO, 2016, May 31). Any tampering can be easily identified.
The certifier appends a hashtag that is signed and dated and submits the record. Any
tampering is detected by alterations in the hashtag (Schmidt, 2015). The Media Lab has
tried to keep the programming specifications as close to Mozilla Open Badges as possible
because Schmidt was also one of the authors for the White Paper for the project in 2011
and effort was made to bring uniformity to digital credentialing. All of the Media Lab’s
codes are in GitHub repository. The lab invites feedback on users’ experiences (Nazar,
Hamilton, & Schmidt, (n.d.). At present, a technology that combines Ethereum’s smart
contract with MIT’s Blockcerts does not exist. While the team at MIT’s Media Lab is
open to Ethereum’s smart contracts, it is in no hurry to develop the protocol. The con-
sensus there is that the Blockcert wallet is more accessible option for students to store and manage their digital credentials (Nazaré, Duffy, & Schmidt, 2016).

A Blockchained Future for Open Digital Badges?

Currently there is much discussion and experimentation about storage, access and verification of Open Digital Badges. Badging was the initial response to online credentialing. By the 2010s there was such a proliferation of digital badges that a virtual “wild west” was created in the online learning environment. This effusion was a response to a felt need. It addressed the “skills gap” of youth and adults who did not possess university degrees and others who needed skills upgrades, the lifelong learners. Online learning gave them an opportunity to acquire credentials by “alternative learning pathways.” But soon universities recognised an opportunity in the digital credential market. In part to co-opt the competition from private online providers, but also it made sense in a digitally driven world to match credentialing to the needs of the times. Some order was brought to the messy digital badges online environment by Mozilla when in 2011, sponsored by a grant from the MacArthur Foundation, it designed and made available free open digital badges, complete with a short instructional program and free backpacks where users could stack their earned badges (Surman, 2016). Mozilla aspired to create an open digital framework that was transparent and that could be shared in social networks across the web and shown in social networks and e-portfolios. By definition a digital open badge is a shared digital artefact (Willis et al., 2016, p. 24). Mozilla designed Open Digital Badges to be portable and stackable (earned competencies could be stored and arranged and re-arranged as needed). The badges had an image that answered to the designer’s taste and needs of the occasion but standardised metadata was “baked into the badge” (information was encrypted within the badge that gave details of issuance complete with electronic signature). Mozilla’s encrypted metadata (the specifications) became the unofficial world standard – as they continue to be today. Periodically, the specifications for the badges are updated. With the termination of the MacArthur grant, Mozilla stopped issuing free open badges, but it is still possible to acquire specifications. In 2014 Mozilla launched the IMS Global Learning Consortium, a non-profit educational technology organisations that include many technology providers world-wide. IMS gives access to the specifications (IMS webpage) for the digital open badges which may be downloaded for free; but interested parties must develop their own badges or else pay a provider.

The original badges provided a backpack for storage in the web 1.0 standard and later 1.1. (Casilli, 2016). After long deliberation – and even discussion about phasing out the backpacks (Surman, 2016) – the backpack was updated to support the Open Badges standard 2.0. Yet expect this measure to be temporary. There is currently a Badgechain project underway for user direct access, retrieval and verification (Lemoie, 2017). It draws on both the MIT Blockcerts technology and Smart contract of Ethereum (Otter, n.d.). It is a necessary step because without independent verification, the badges can become worthless. Badges could be “orphaned” or worse turn into “zombie” badges when issuers no longer want or are unable to host them or when a software program falls into disuse even when the credentials earned are still valid. Badges could also be “siload” and remain unused when verification is problematic. When badges are not sup-
ported by networks of trust that a sustainable credentialing system requires, both learners and employers lack confidence in them.

Digital credentialing also presents commercial opportunities. Purdue University in Indiana, a highly ranked in engineering, was a pioneer in designing and applying digital Mozilla apps. In 2012 it designed the Purdue Passport (Passport, 2012). Now the app may be downloaded from Apple’s iTunes and Google Play (Passport, 2018). There is a considerable fee, but for students and faculty of Purdue it remains free. It is stated on the app that badges may be stored in the backpack – a stop gap measure at best. No doubt, many users are awaiting Blockcerts to become available for Mozilla Open Badges.

**Conclusion**

Blockchain promises permanent authentication and storage for the growing alternative credentials market that is made up of various kinds of Microcredentials, nanodegrees, MOOCs, and certificates / badges from various types of training programmes while giving users direct control and management over their credentials. Most of these alternative credentials supplement the education of older learners who received little or no IT training as part of their formal education. Yet today we are all lifelong learners. It is also encouraging that there is growing indication that employers are reviewing the actual competencies of applicants, not just dates of graduation and universities attended (Horn, 2017). In this respect, Blockchained credentials may help to reduce the skills gap. Moreover, Blockchain offers a high degree of security because a distributed ledger is hard to hack.

The most serious problems with blockchain technology are the issues of scalability, privacy and increasing storage capacity. Scalability refers to increasing the speed of blockchain deliveries. The blockchain today is slow and uses a lot of energy. Yet fusing blockchain with AL technologies will increase efficiency and delivery, and blockchain is one of the drivers of Web 3 development. Privacy is another issue since all participating nodes share the information even forever. For now the public /private keys have dealt quite successfully with the problem although the issue will need to be further addressed as well as the related topic of information editing. A further issue is storage. Yet experiments are underway with cloud computing especially the decentralised cloud. And, no doubt, other options will appear. It is also likely that in some areas centralised web options will remain even as the decentralised web develops.

Blockchain at this point is an experimental technology, except in the case of Estonia where it has a longer track record dating back to the cyberattack of 2007. Yet even though the technology is in its infancy, its power, relative security from hacking, and durability make it an attractive option to many respected institutions such as MIT and Open University, UK. At this point, there are many pilots concerning the application of this technology to higher education in Europe, EU and the USA. The field is wide open for future work. More information is needed about the operations of blockchain in a higher education setting. Case studies that would engage the technology in various courses and programmes would be most enlightening about its potential and relevant applications. The most credible models are Open University’s smart contracts with Ethereum for storing Microcredentials and MIT’s / Learning Machine’s Blockcerts. It is not possible to combine the functions at this point because the technology is still under development but advancing rapidly. The dynamic innovations that are occurring in
technology almost on a daily basis will sharply increase the demand for lifelong learning in the future. Blockchain promises an infrastructure for learner records that is permanent, secure, and offers reliable management for lifelong learning development, giving learners direct access and control over their achievements. Moreover, the technology supports a constructive learning approach that is student-centred and recognises flexible pathways in education. These developments are fully in line with Standards and Guidelines for Quality Assurance in the European Higher Education Area that requires a more student-centred approach to education and recognition of more flexible learning pathways, including competencies gained outside the formal curricula (Standards and Guideline, 2008). The notion of alternative credentials and the promise of blockchain record management is also supported by the goals of the United Nations Development Programme (UNDP) that recommends accessibility to educational opportunities for all children that will teach them the knowledge and skills necessary to promote sustainable development – goals that are fully endorsed by the EU (UNDP, 2030).

Acknowledgement
The research and writing of the article has been supported by the European Regional Development Fund (ERFD/ERAf) project “Technology Enhanced Learning E-ecosystem with Stochastic Interdependences – TELECI”, Project No.1.1.1.1./16/A/154.

References


Blockchain and the Future of Digital Learning Credential Assessment and Management

12 November, from https://medium.com/mit-media-lab/what-we-learned-from-designing-an-academic-certificates-system-on-the-blockchain-34ba5874f196


UNDP (United Nations Development Programme) 2030. Support to the implementation of 2030 Agenda for Sustainable Development.


Correspondence concerning this paper should be addressed to Merija Jirgensons, Senior Researcher, Faculty of e-Learning and the Humanities at RTU, Distance Study Learning Centre, Kronvalda Bulv. 1, Riga LV 1010. Email: mjirgensons@gmail.com
Appendix A

KMI Open Learn: Image of Smart Contracts as a Record for Microcredentials (Badges)

<table>
<thead>
<tr>
<th>Name</th>
<th>Date Issued</th>
<th>Badge Assertion Contract Address</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17 Jun 2016</td>
<td>0x955d3b4135b5eaf647b223d04d6e135</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>26 Aug 2015</td>
<td>0x85fa734e5294e7c78e8657570f98e6e</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>10 Feb 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>01 Apr 2016</td>
<td>0x89f9f9a95f141b7097f10e108e6c069</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>11 Apr 2016</td>
<td>0xc4496d0a201006b421b2c3c3a16f910</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>07 Nov 2015</td>
<td>0x8b2e6d3e6b461e785f2b4463428f8864</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>21 Oct 2015</td>
<td>0x57f750e0305e2009315f6a2b62b5f7</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>05 Nov 2015</td>
<td>0x57f750e0305e2009315f6a2b62b5f7</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>13 Dec 2015</td>
<td>0x8b2e6d3e6b461e785f2b4463428f8864</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>02 Aug 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>25 Mar 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>26 Mar 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>24 Apr 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>23 May 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
<tr>
<td></td>
<td>23 May 2016</td>
<td>0x18102f9e690609a8e14a5d99e5a05067</td>
<td>Download Badge</td>
</tr>
</tbody>
</table>

Source: Knowledge Media Institute (KMI), Open University, UK, OpenLearn

Appendix B

Blockcerts Model Image of Blockcert and verification similar to the MIT model

Source: Blockcerts Open Standard Image
Abstract
Sustainable education and education for sustainable development (ESD) have witnessed a deserved number of research studies in the recent years. The present article proposes a holistic research framework for the research on sustainable education and education for sustainable development in the 21st century. The article aims to choose a more holistic research perspective by avoiding a piecemeal approach in education research. Moreover, it proposes some strategically important ideas about the use of approaches and methods for sustaining the generational readiness for sustainable development. The paper proposes a general framework for pedagogy and practice for ESD research which is open, holistic, strategic, sustainable, and integrated. A broader perspective has been developed as the relation of the ecological–cultural–social environment aspects seen in a broader adaptive evolutionary sense as a condition necessary for the development of a human species and the development of these conditions in the evolutionary process. The choice of a broader perspective is proposed by relating it to an observational study on Generation Z that many educators, social scientists and the populations have already started recognising as one of the participants in the intergenerational process. The phenomenon of Generation Z is new; its features have not fully revealed in their apparent form, yet. Furthermore, the generation has not reached its maturity yet, but the development of this phenomenon is inextricably related to the issue of generational commitment, which is also related to the evolutionary development. The observational study has been carried out by involving participants from VECC Daugavpils Vocational School. The evaluation of the participants’ real experience in a wider and broader framework has been used to draw strategic conclusions, which will help keep focus on the need to sustain generational readiness for sustainable development in the harmonisation of the choice of pedagogical approaches and methods.

Keywords: sustainable development, generational succession, pedagogical tasks, generation Z, choice of approaches and methods
Holistic Research Framework for Education for Sustainable Development

The paper considers the issue of the choice of pedagogical approaches and methods in a broader perspective to highlight the topicality of education for sustainable development (ESD). Development of a broader framework will be based on the authors’ pedagogical and research experience, focusing on the choice of pedagogical approaches and methods that are related to the sustainability phenomenon and transformation of education into education for sustainable development.

The issue of the choice of pedagogical approaches and methods is inherently changing and improving due to its complex nature. It is improving if one considers it in the perspective of education and its aim development, and especially if the educational aim is formulated as the promotion of evolution of consciousness in the universe (Whitehead, 1929). Formulating the educational aim in a broader perspective of open dynamic adaptive evolutionary system in pedagogy can be considered as one of the traditional characteristics of pedagogy. However, in pedagogy, there are many cases demonstrating the educational aims to be and still are very precisely formulated and measurable. The understanding of educational aims and their discourse has been deeply rooted in the development of pedagogical consciousness and the evolution of the relationship between nature and society, which is the broadest context of pedagogy that determines the breadth and depth of the educational aim in a general or specific definition.

In recent decades, a need for a holistic understanding of sustainability phenomenon has gradually arisen, evolving as a need and condition for choosing new perspectives in education. In global use, the concept of sustainable development in the perspective of social development was formulated at the end of the 20th century, highlighting the relationship and responsibility of generations, i.e., the needs of the present generation must be met without compromising the ability of future generations to meet their own needs (UN, 1987). In spite of the global and local activities launched on the implementation of the idea of sustainable development, the 21st century claimed to be the phenomenon of the Anthropocene age, which became a reality that had to be recognised not only in science where the phenomenon had already been known (Millett, 2015; Kress & Stine, 2017; Tønnessen et al., 2016; Reyes, 2018).

Many changes have taken place during the establishment of the Decade of Education for Sustainable Development (2000–2005); changes have also been made to the DESD (2005–2014), there is an ongoing intensive work on the implementation of the Global Action Programme (2015–2020) (GAP) and the achievement of the Sustainable Development Goals (SDGs), as well as Education 2030 is envisaged to be implemented. Despite intensive cooperation in achieving SDGs, the overall situation in the global development trajectory has highlighted the direction of unsustainability, in which education contributes to the regeneration of unsustainable behaviour patterns (UN, 2011). This situation has already acquired the name of the Anthropocene era in recent years (Figueroa, 2017). The phenomenon of Anthropocene has gradually been revealed and has now become a phenomenon that demonstrates the unsustainable quality of the ecological, cultural and social relationship of a human being. Anthropocene conditions have become the current pre-requisites for resolving ESD, education and science development issues.

At present, in educational studies one may encounter instances, in which Anthropocene relationships and their inherent problem solving are used as a framework for
research. This can also be identified in cases where issues of education quality research are addressed and the foundation for educational reforms and even reform cascades is elaborated. There are also studies that look for more holistic frameworks. Calls for more holistic research are becoming increasingly common. As an example, it is worth mentioning the conference “Social Innovations 2015: Pathways to Social Changes” held in Vienna, which raised the issue of the need for more holistic research in social sciences and humanities as a challenge for future European and global research, policy and practice, and it clearly articulated the need for more holistic research, again.

Mentioning some introductory ideas at the beginning of the article, we have already identified, in our opinion, the important supporting ideas that will help dip into a more holistic research framework with interest using these ideas and views in the ESD research. To our mind, the establishment of a reference system, when it comes to the development of a broader holistic framework for ESD, must necessarily begin with setting the educational aim. The formulation of educational aim with its inherent level of generalisation as well as its content indicates the approach to education and the possible search for a direction of sustainability and/or unsustainability. The formulation of the educational aim by Whitehead (1929) opens up a perspective for a holistic explanation of the evolution of both education and consciousness and proposes using a comprehensive explanation of the evolution of education and civilization. There are no restrictions in the definition; it offers a holistic perspective on the investigation of complex phenomena of education and their relationship.

In the current circumstances, Whitehead’s educational philosophy plainly addresses the issue of complex, currently called wicked problems, which has been the foundation of theories elaborated by many prominent scholars and researchers in the early 20th century. At that time, the perspective of a complex approach was based on the popularity of Darwin’s theory. The second half of the 20th century marked the development of the theory of wicked problems, which at the beginning of the 21st century made it possible to approach wicked problems from a new perspective, without limitations and taking into account transformations that a human being acquired in their activities, attitudes and relationships, which had developed during the solution processes of wicked problems (Adam, 2016; Bogg & Geyer 2007; Cutanda, 2014; Hauss, 2015; Holland, 2014; Koopmans & Stamovlasis, 2016; Salite et al., 2016). The complex approach is inseparable from a holistic approach and complementarity of this approach is now known as wickedness that has already entered studies that are looking for a more holistic or just holistic research framework in order to solve contemporary wicked problems (Lewin, 1999; Mitchell, 2009; Morin, 2008; Norman, 2011; Waldrop, 1992; Wells, 2013; Вахтеров, 1913).

Broader perspective of the framework is considered in terms of a complex approach. Complex processes are non-linear, completely unpredictable. They cannot be solved at once; the humanity is solving them continuously through diverse activities. In the case of a complex approach, the understanding of processes is explained as the development of open, adaptive evolutionary dynamic processes that manifest themselves as fluctuations of the qualitative states which may lead to changes in the quality of the system that is related to changes in the direction of development processes.

Reflecting on the above-mentioned ideas and complex phenomena, which can be manifested in different forms of commitment, we can begin “rolling up” these ideas into a ball of interconnected complex ideas that can contribute to identifying a more
holistic research framework for ESD research. Reflecting on the ideas mentioned is based on (1) our life experience and personal research interest in the use of more holistic research frameworks for ESD research, and (2) some trends that have matured in science and manifested themselves as transcending traditional studies towards broader holistic perspectives through a deeper understanding of all interdependencies and the role and interrelation of different integration approaches in the contemporary science. The choice of ideas from the viewpoint of our experience and the choice of trends with regard to different sciences and specific fields will, at first, be proposed from a very long distance and from an outside perspective. Adhering to this viewpoint, we will not lose sight of the reality of the Anthropocene phenomenon.

From this perspective, the choice of a broader holistic perspective in the current circumstances should begin with setting the educational aim. Following Whitehead’s view of the educational aims, we have already highlighted the need for educational goals that do not restrict the use of the holistic framework and the implementation of the society’s targeted activities as well as do not restrict the possibility of implementing the reorientation of unsustainable activities towards achieving a common educational aim. The phenomenon of Anthropocene is a substantial reason, which indicates the impact of more narrow and specific educational goals not only on education, but also on the quality of the whole system, which was most affected and is still affected by changes in nature–human relations. Public support for the implementation of the ESD goals has increased, but the state of nature–human relations has remained under the dominant influence of anthropocentrism, egocentrism and currently apparent technocentrism. Unfortunately, they are not all influences that are known in human–nature relations.

It is important to identify these different effects from their ontological perspective when formulating and elaborating an educational aim and a broader holistic perspective. The use of such a perspective, often both in research and in the organisation of practical activities, reaches the status of the so-called “research limitations”. Such cases narrow down and limit both the scope of research and the evolutionary processes of consciousness in science and researchers’ approaches.

Over the past decades, ontological studies can be found both in specific traditional sciences and in specific fields of science (Pipere et al., 2015; Salóte et al., 2016). The development of wicked problems and the evolution of processes without an ontological basis are serious obstacles to the study of these relations.

The call for the implementation of more holistic research is becoming increasingly convincing, for example, in the formulation of ontological addiction proposed in Niiniluoto’s theory (2002), in which A is ontologically dependent on B, if A does not exist without the existence of B. In order to determine whether A is independent of B, it is necessary to determine whether A will exist in the world if B disappears, or when the ontological perspective is used in theoretical studies of the Anthropocene framework and it finds the possibility of using ecocentrism that allows taking a more holistic view to a wide variety of contemporary problems and cases (Heikkurinen et al., 2015).

In the context of Anthropocene, such issues can contribute to the clarity of the limiting effects of previous years on the illusion about progress. In order to conduct more holistic research, it is necessary to evaluate the real causes of scientific constraints for cases that created current problems and deformations in the global system of relations and attitudes, which became unsustainable.
Holistic view is also supported by Revonsuo (2006), who highlights the issue of the origin of consciousness as a biological phenomenon and looks at this issue from an etiological perspective with the aim of investigating the causes of unhealthy phenomena. In the environmental education in the 1980s and 1990s, this was taken into account and is still taken into account in terms of the holistic approach and holistic ecology. But in studies where the holistic approach has not been used, such issues are rarely raised. Revonsuo (2006) substantiates the topicality of the issue from the evolutionary perspective of consciousness as a biological evolutionary phenomenon and his vision of the world evolution related issue, which is still unresolved in science, can provide stakeholders with the prospects for holistic research and can even propose new opportunities in the search process in order to improve the role and influence of science.

The authors have “rolled up” ideas as a way of summarising the foundation that can be used in the ESD studies as a research framework, which can help scholars to find possible solutions to the problems and consequences of Anthropocene. Whitehead’s proposal that the development of educational aim content should be based on the idea of promoting the evolution of consciousness, in the current situation, is no longer just a proposal for specific and profound theoretical research, as it was treated by researchers, practitioners and policy makers in previous years. It has recently become an impetus for the search of a transdisciplinary approach, where academic and applied researchers cooperate with different stakeholders with an aim of investigating contemporary complex phenomena or processes. The specific feature of the approach is that in this case participants of the research use their specific goal framework for particular activities and study the nature of the phenomenon in order to find solutions that also require a more holistic framework. This proposal enables researchers to use the open dynamic adaptive evolutionary development perspective (Koopmans & Stamovlasis, 2016), in which the development of ecological-evolutionary relations opens up new opportunities for using more holistic perspectives for the assessment of the effects of ontological dependencies and dynamic changes on the directions and quality states of processes.

Transcending traditional sciences to wider contexts that go beyond the interests of a particular science is no longer about “the level of gentleman’s courtesy”, but it can be viewed as the emergence of issues that can recognise the interest of researchers in larger analytical units (Savio, 2010), which requires a wider perspective. This can be treated as interest in a more holistic research. If this is seen by generalising various cases in the development of science over the past fifty years, there can be observed the widening of the integration range from disciplinary interest to interdisciplinary and transdisciplinary. At present, there is a growing tendency towards the development of a more holistic perspective regarding the two phenomena, for example, ecology and evolution (Hendry, 2016), nature and nurture (Call, Bearer, & Lerner, 2004), and the transfer of the findings identified in these studies from one process to another substantially similar process becomes more apparent. For example, the experience gained from the research on hurried salmon evolution can be used to evaluate human evolution, where activities and aims were not matched with the speed required for the development or excessive use of nature (Hendry, 2016). In-depth study of this category may also lead to some innovations in education or hasty reforms of education.
Pedagogy as a Framework for a More Holistic Research

Development of a more holistic research framework involves a certain truth that philosophical systems indicate the approaches that serve as a general framework for organising research activities and choosing the appropriate research methods. The development of methodological framework in every science plays an important role in linking the perspectives of the philosophy of science and the philosophy of a particular science. Nurture is the developed philosophy of education, but the question arises why the pedagogical philosophy was not developed. Instead of the name of pedagogical philosophy, it is often possible to come across “pedagogy and philosophy” (Farguhar & White, 2018; Haynes & Morris, 2012). Perhaps, it could easily be argued that the perspective of pedagogical philosophy and the relation of pedagogy to philosophy have remained in the concept of pedagogical mission (Salóte, 2015). The current divergence of global development to the unsustainable direction and the orientation of education towards the reproduction of unsustainable patterns of behaviour raise the question of whether the origins of pedagogy are not traced back to the history of philosophy as a united body of science in Ancient Greece. In the context of contemporary unsustainable development, the question is whether it is not necessary to look at the fact that the science of pedagogy has been for a long time under philosophy because pedagogy is a new science. Has the long-standing relation of pedagogy to philosophy strengthened wisdom in its nature and does the nature of pedagogy therefore inherit any specific characteristics of philosophy?

Has pedagogy that is included in the content of philosophy not found the way for its own quest for the formation of a person’s nurture, the purpose of nurture, the development of the society’s purpose and the individual’s culture and consciousness, and the relation to nurture? The pedagogical mission has retained the tendency to rise beyond what is known, achieved with the appeal to develop a person’s unique ability to get to know the Good, the Beautiful and the True in the world and learn how to make these values an integral part of ourselves and the world.

From the perspective of the development of pedagogy, there is a call to see that the evolution of consciousness is a complex task, in which the goal of the pedagogical mission, when viewed from the perspective of intergenerational commitment and of generational development, must also be considered a task for the search of the direction of sustainable development.

From the ontological origin, when action pedagogy had been understood as an inseparable part of philosophy, the strategic perspective of pedagogy was developed, which challenged the participants of the pedagogical process to use wider perspectives in explaining and understanding complex processes. From its origin, pedagogy has derived from philosophy teachers and acquired an inclusive, strategic, speculative and future-oriented pedagogical consciousness and the nature of science in an open dialogue environment.

The present article addresses the issue of the choice of pedagogical approaches and methods in a broader framework that is created around the concepts of education for sustainable development, generational development and intergenerational interaction in sustainable or unsustainable direction. Such a broader perspective of the research has been used, by interrelating it to the identification of practical experience of participants that took part in the observational study. The evaluation of the participants’ experience in the framework of broader general research has been performed to obtain strategic
Education for Sustainable Development: The Choice of Pedagogical Approaches...

findings, which, by harmonising the choice of pedagogical approaches and methods in a dynamic pedagogical process, would help to maintain focus on the need for generational readiness for sustainable development.

By its very nature, such a complex task corresponds to the nature of the pedagogical mission as well as the nature of pedagogy, which offers a strategic perspective for the choice of approaches and methods. The search for a pedagogical strategic perspective from a broad general holistic perspective of the research, with the assessment of a specific participant’s experience at the level of the pedagogical mission, can open up a broader view on the choice of pedagogical approaches and methods that is usually considered and addressed in the educational system by somewhat narrower interest of didactics and specific scientific disciplines, which more often is proposed to meet the needs of the market.

Characteristics of Generation Z

Many educators, social scientists and the public have already started recognising Generation Z as one of the participants in the intergenerational process. The phenomenon of Generation Z is new, its features have not fully revealed in their apparent form yet, the generation has not reached maturity yet, but the development of this phenomenon is inextricably related to the issue of generational commitment, which already now has the sense of the evolutionary development, and it was both in the development process of the human species and long before the development of the human species as the first beginning.

Therefore, we have constructed our perception of Generation Z by studying opinions of practitioners and researchers about the features of Generation Z that have already been identified in different sources. We have found out that scholars have drawn attention to the issue of Generation Z due to a variety of reasons (accidental interest, concerns about the development trends of society, worries about the health of Generation Z and the further development of this issue, the attempt to understand the generation as a whole, the development of the Generational Theory, etc.). We have investigated the already known features and evaluated them from the perspective developed as our view of a more holistic research framework for ESD. In this holistic framework, we have included the framework of pedagogy in its broadest sense.

In this framework, we have also included known and more specific features and trends of Generation Z as well as identified the issues that arise in the perspective of a more holistic framework, which is much broader as it is needed for the analysis of specific characteristics. A broader framework to our issues opened up the opportunity of supplementing analytical and evaluative thinking with the integration, synthesis and synergy contexts by constructing perception of Generation Z. In the context of our research, these issues are of value if we consider value from the perspective of the desired outcomes and research framework allows searching for these desired outcomes in the direction of enhancing sustainability, integration, analysis and content items, in the compliance of adaptation and evolutionary process with time requirements necessary for continuity conservation in education and sustainable development processes. Using a broader and more holistic framework, we can relate the known with issues that are not evident at a particular research level, which allows observing specific characteristics and properties only as complex formation, limiting the possibility of viewing the formation
as belonging to a wider complex phenomenon and in conjunction with other complex phenomena in the complex world. This opportunity is opened up by the specific nature of pedagogy, which gained its nature evolving within the philosophical framework, and which today is as ontological origin of pedagogical science.

By surveying the sources of literature on Generation Z, we have found several features that indicate trends in the studies of Generation Z, which enabled us to identify issues that are valuable in the context of education for sustainable development. The present article will focus on the four trends that already provide a basis for more holistic research in education: (1) the development and improvement of the Generational Theory; (2) the relation of Generation Z to the technological environment; (3) social experience of Generation Z and environmental impact; and (4) activity, cooperation and mind-set trends of Generation Z.

Development and Improvement of the Generational Theory

Neil Howe and William Strauss proposed the Generational Theory, stating that generation is determined not only by the birth years but also by the values that result from their experience (Howe & Strauss, 2009). Values work invisibly and determine our behaviour in many aspects of life: the way we communicate, manage conflicts, and the factors that motivate us.

It is now apparent that in the studies on Generation Z scholars are searching for answers to the development of generation and its period of existence. It is mentioned that Generation Z was born around 2000 (Čapka, 2014), American researchers state that Generation Z was born in the period of 1993–2005 (Turner, 2015), Lithuanian researchers also support the view that the generation period is from the late 1990s to the early 2000s (Levičkaitė, 2010), and Latvian researchers (Jurgēna et al., 2018) consider that the development of Generation Z is related to the effects of global unsustainability and technology, and focus on a weak degree of integration of natural sciences and social sciences.

Generation Z already has a number of “working” titles found in research (Generation Z, Generation M, Net Generation, Internet Generation), which demonstrate the tendency that the issue of Generation Z is viewed as a transition generation developed between the 20th century and the 21st century. The development of the Generational Theory enables us to see its specific nature and the way, in which the generation fulfils its activities in the environment inherited from previous generations and changed as a result of its activities.

In the context of our research, we have concluded that a more holistic development of the Generational Theory is one of the opportunities for solving the existing educational problems and reorienting education to sustainable development. The development of the Generational Theory is one of the issues that opens up an opportunity for the development of more holistic research as well as provides the ability to seek and find approaches and methods for overcoming the limitations of research that can enter education and science through natural changes in human–environment relations and which may also occur in education and science due to non-compliance of approaches and methods, which can lead to hurried or delayed processes. At the beginning of the paper, we have already related it to the development of the Anthropocene phenomenon. From the perspective of our more holistic framework developed, where pedagogy has been viewed from its broader, initial and ontologically determined perspective, it can be
seen that the development of the Generational Theory should be further developed on the basis of a complex approach, which provides an opportunity to conduct more holistic research in education. In terms of the Generational Theory, the concept of generation is a broader research unit, which refers to respect for the species evolutionary process, in which there is the indivisible relation of each individual as the human species and a member of society to the environment. It is a unit of quality of these relations, which also determines the quality of the entire system.

Relation of Generation Z to the Technological Environment

Studies of Generation Z share a common feature; they relate to the use of technology. The studies address issues related to the search for new methods, the provision of new information and the ways of its distribution affecting all aspects of life and changing the educational environment. New complex problems arise that become trends when everything is mixed up and can be introduced as a broader category by referring to it as intermingle (Salóte, 2015) or other phenomena occur that affect the educational environment and develop the e-learning environment (Kapenieks, 2016; Kapenieks & Salóte, 2012).

What was considered the “future technology” for the previous generation became reality for Generation Z. Generation Z is an active user of technology and sees the technology as an instrument (Van den Bergh & Behrer, 2016). Generation Z presents a challenge to society as many people think that their behaviour is quite different, in particular different from previous generations, and this behaviour can lead to changes in consumer behaviour (Schlossberg, 2016). But, at the same time, the perception is developing and experience is accumulated that work with the cutting-edge technology promotes a more professional activity, which also contributes to the sustainable development of one’s own life and the environment.

From a broader perspective and in particular from the ontological perspective, technology has been and also remained an instrument or a tool. In the context of action process and work, its essence has not changed. The aims of its use have not also changed since all Homo sapiens used tools of previous generations as instruments that were consistent with the consciousness that man had attained at that time and served as the search for new tools and the further evolution of consciousness.

In the context of the Anthropocene era, thinking and action have changed and there one can identify a lack of succession and interrelation. In the first part of the paper, we have referred to Niiniluoto’s (2002) foundation of the ontological addiction. In the Anthropocene, we can ask a question whether anthropocentrism will exist with the technosphere if the ecosphere disappears. And will it be possible to save education from unsustainability if the deepest ontological roots of pedagogy that are no longer in the science of education are destroyed?

Social Experience of Generation Z and Environmental Impact

Emily Anatole emphasises that Generation Z is realistic and pragmatic. Generation Z was born seeing terrorist acts, surviving crises, seeing their parents overcome challenges in life (Anatole, 2013). Generation Z lives in an era of economic and political instability, tough competition and globalisation, and especially this generation needs to take action so that life on the Earth could continue.
Today’s young people living in the technology age are different, and this is self-explanatory. But in generational research for ESD, one has to look for the answer: what are the changes in terms of the quality and development direction of the generation’s life-sustaining activity? Will these changes contribute to the progress of the society towards sustainability, or sustain unsustainable Anthropocene relations? The variety of theories, known fragmentation, mixing everything and hybridization are the conditions of the Anthropocene age; it is the environment of living conditions of Generation Z. In these circumstances, education does not look for Aristotle’s educational tasks, where Aristotle envisaged the development of knowledge, skills and \textit{phronesis} (practical wisdom) \cite{Aristotelis1985, Salote2009}. The endless education reforms or even cascades of reforms are a characteristic feature of Anthropocene, which has been accompanying Generation Z since its inception.

There are many different theories that are internally and mutually controversial. In the sources of literature, one can find the conclusion that there is no evidence of the harmful or beneficial effects of the current circumstances on young people. The changes in the Anthropocene era have gone a long way towards unsustainable development, and the need for more holistic research in science has serious implications that suggest that in unsustainable relationships one should seek new perspectives that can help understand the ongoing fundamental changes.

\textbf{Activity, Cooperation and Mind-set Trends of Generation Z}

Characteristics of Generation Z have many contradictions that have arisen in the environment saturated with contradictory processes and their consequences. There are many different views about the readiness of Generation Z to address life and inherited environmental problems. In the communication and information field, in which Generation Z is developed, there is pollution and all kinds of addiction, which already raise concerns about the health of the generation and the further path of consciousness evolution. Almost all information is found on the Internet by young people, they do not ask parents, teachers, the first thing they do is asking Google. They find the location with the help of a navigator, and they buy everything they need online. The skill and the habit of simultaneously doing homework, living in social networks, listening to music, and fulfilling other urgent work are the combination of activities and cooperation of Generation Z, which is a generational feature.

Perception speed is increasing. In the e-environment, everything happens much faster than in real life. Everything is perceived quickly and haste becomes apparent in the action process. The perception of the real world is distorted due to its inherent lack of perceptive experience and unnatural, over-saturated recognition due to the perception of technical information. The perception of the ecological-cultural-social environment necessary for human life is changing. In the first part of the paper, we have mentioned an example of the phenomenon of the hurried salmon evolution, which is known as a phenomenon for the pursuit of human hasty interests. By analogy, we can ask the question: are there any similarities in education reforms with this mankind’s experience of spurring development? The current environment and the activity, cooperation and mind habits of Generation Z, which become recognisable, are the reason for seeking answers to these questions in the educational research for ESD.

The impact of the technology has led to the fact that young people do not need to remember everything because information can be found quickly. At the same time, it is
believed that Generation Z analyses a large amount of information without problems and can quickly find the answers they need.

In the context of our more holistic research framework, the question arises: at what level is this analysis implemented? Does the analysis relate to the mind and activity habits of synthesis, integration or synergistic competence? The need to develop research in this direction is reassured by a number of features that have become characteristics of Generation Z:

- The brain is accustomed to fast perception of information, boredom appears at a less intense flow of information;
- Life must be dynamic; movement, emotions and spontaneity are needed;
- Text message thinking, difficulties in expressing thoughts in live conversation;
- Clip thinking, difficulty concentrating on the studied subjects during one and a half hours, the need to use a variety of methods aimed at drawing and sustaining attention;
- Multimedia technologies are being used inefficiently.

Employers have observed that Generation Z is convinced that they are invincible; they show desire for “big money”, desire not to be involved in the work process and weak interest in work.

Generation Z has a different mind-set with a different perception of the world. The influence of the Anthropocene on its activities, cooperation and mind habits is already evident, and this is a condition that requires the society to address the issue of conducting more holistic research and implementing education reforms.

Methodological and Theoretical Assumptions of the Observational Research

Global changes in society have significantly changed the social habits of children and young people; they are radically different in the daily activities, the understanding of values and the life goals. Therefore, we have created a broader and more holistic perspective when developing the framework of the research, in which we responded to the pedagogical tasks, pedagogy as a broader perspective of science, revealing its broader and deeper essence: orientation towards sustainability, unifying aim, action, participation, cooperation, research, learning, strategic vision, integration, ontological addiction and value creation. We have established the theoretical foundation around the concept of generation, referring to the Generational Theory. In the research devoted to the issues of generation and the Generational Theory, there is a tendency that researchers use traditional methods, carry out experiments, refer to the result of experimental and control groups and obtain conclusions that speak precise mathematical language. But in pedagogical science, the mission of a teacher, the essence of which was found at a time when pedagogy was not separated from philosophy, speaks another language that through action invites, inspires, opens up to participation and gains experience.

The view that a student learns and develops in the process of gaining experience is supported by many Latvian scientists (Pētersons, 1931; Students, 1998; Žogla, 2001). Latvia has developed experience in which not only scientists from Latvia and the Baltic States, but also scientists from Europe and other countries in the world have been involved in educational research for ESD. Since 2007, these studies have been concentrating around the Journal of Teacher Education for Sustainability (JTES); the Journal of Discourse and Communication for Sustainable Education (DCSE) joined this process in 2010.
The journals have already accumulated research demonstrating the goals of sustainable development, the nature of sustainable education and the phenomenon of sustainability (Bell, 2016; Carbach & Fischer, 2017; Huckle, 2012; Hurtman, Johnson, & Hill, 2017; Kalaitzidis, 2012; Makrakis & Kostoulas-Makrakis, 2012; Miedema & Bertram-Troost, 2015; Pace, 2010; Tillmans, Holland, & Filho, 2017). Apart from traditional research, JTES has accumulated experience in using participatory and/or educational action research in more holistic research (Gedzüne & Gedzüne, 2010; Grīšāne, 2008; Pipere & Salite, 2006; Salite, 1998; Salite, 2008; Soobik, 2014), and there are also studies and experiences that seek to underpin the use of approaches and methods in the current context (Aldahmash et al., 2017; Flores et al., 2014; Hurtman et al., 2017; Kabadayi, 2016; Mohammadi & Moradi, 2017; Okeke & Mtyuda, 2017; Zunker, 2012). These studies recognise the distinction between a sophisticated and complex approach, and provide the opportunity of using a more holistic research framework. Salumaa believes that all organisational and technical difficulties that arise in the action process can be successfully solved, unless people take active part in it (Salumaa, 2017).

In terms of the research methodology for conducting a more holistic research, the authors have chosen the framework of the educational action approach, which opens up the opportunity for organising a more holistic action, which allows the action to be carried out around the interests of the participants themselves, to work around matters that are important to their lives. Especially since the action research has a strategic potential and serves also as a method for organising and implementing the action (Kapenieks & Salite, 2012; Kravale-Pauliņa & Oļehnoviča, 2015; Salite et al., 2016). We have been convinced of this choice by the specific features of Generation Z that have already become apparent in observation (the basic method of pedagogy) and investigation of participants’ experience and results obtained in action using qualitative methods, which are natural to the methodology of the action research and are in good agreement with the holistic nature of pedagogy and the cyclical nature and growth of the action research that are identified by the participants themselves as changes gained.

The choice of the research foundation has also been based on the relationship between pedagogy and philosophy, as seen by Dewey, which was his fundamental faith in pedagogy, which he linked to the Melioristic Motive, or the faith that this life was neither perfect nor bad that it could be improved only through human effort (Hildebrand, 2008).

If adults and researchers who study youth culture find it different, unknown and incomprehensible, more holistic research should enable young people to address their own life issues in the way they see it and help them find the most important educational aim.

The research on this topic is of interest to business executives, education system representatives and those who need to get along with young people on a daily basis. Therefore, the issue is open for discussion and there is a reason to consider a variety of typical features of Generation Z.

Aims, Tasks and Course of Implementation of the Educational Action Research

The educational action research was initiated pursuing the significant aim for the development of an educational institution, to improve the study programmes by developing an integrated cooperation model promoting the development of an educational institution.
The article presents one of the cases of this broader action research, the task of which was to initiate the improvement of the study environment of the technical study course “Railway Technical Operations Regulations” by launching educational action research in order to use the cooperation force of students and instructors to improve the study environment of the study course. We call this part of study the observational research.

Improvement was initiated with the aim of enhancing the study course by:

(1) methods and techniques for identifying problems, visualisation, making personal meaning and discovering new values, integrating professional business games in the study course;

(2) pedagogical conditions such as collaboration, conflict resolution, compromise and cooperation, by undergoing transition from knowledge assessment to academic achievement assessment, organising cooperative learning during practical classes and introducing cross-curricular integration.

Research Design and Participants

The observational research involved three student groups and instructors, who were also participants in the action research. Such research has been conducted for the first time, in Latvia educational action research at vocational schools is a new approach. The observational research involved three groups of students acquiring the study course “Railway Technical Operations Regulations” at VECC Daugavpils Vocational School. A total of 67 students were surveyed: the first and second groups (n=23 and n=22 students, respectively) and the third group (n=22 students). Participants were 17–18 years old. The duration of the observational research was half a year. In this research design, the authors used two variants of the intended educational action research. We anticipated that action research would be more holistic and affect participants to a larger extent, in which most participants would open up to solving important issues of their life with personal interest, and a more open cooperative environment would be created in the context of action research. The relationships in which an instructor as a participant of an action research invites students to solve real-life problems through action might be less open.

In the first variant, we involved two groups of students and organised action, allowing the participants of the research themselves to look for opportunities to address the issues of improving the study environment within the study course. In this type of the action research, instructors listened to the students’ proposals and supported the students’ ideas and choice of action, or instructors followed the students’ ideas and engaged in their implementation.

In the second case, in the third group, the implementation of the educational research was organised on the basis of an instructor’s leading role well recognised in education and the involvement of students in the action, following the ideas proposed by the instructor, persuading students that this would improve their own life in the educational institution and their future professional life. The role of the instructor in both cases was understood within the framework of educational action research, which would provide opportunities for implementing a more holistic perspective. The use of an open perspective within the framework of the action research is a feature that was taken into account and interrelated to the task of improving the study environment for the acquisition of the study course. The third group preserved the relationship between the instructor and
the students that did not destroy the perception of an instructor’s leading role and did not abandon the prevailing beliefs of adults usually looking for “how should be done and should be right”, as we found out this was a way that did not completely correspond to the nature of Generation Z.

By using these two cases, the authors intended to create a situation to demonstrate that an instructor’s leading opinion might also have less impact in the case of action research, as it was in action research that was personally significant. Consequently, we attempted to demonstrate the importance of the strategy, methods and techniques used to investigate generational needs and habits.

Quantitative and qualitative research methods were used in the part of the observational education research. Especially an observational method characteristic of pedagogy was used. At the beginning of the study course and upon its completion, students and instructors, as well as participants and observers involved in the implementation of the study programme assessed the benefits gained in the action research, which were considered in a broader perspective of the overall aim of the educational action research, in the context of development of programmes and elaboration of an integrated cooperation model.

In the observational education research, we found out four criteria that were identified by participants in both surveys and observations throughout the course of the research and at the beginning and the end of the research. We used these indicators to visualise the changes gained during the research at the trend level.

Research Findings and Conclusions

In the paper, the authors used only the results obtained by organising and implementing the action research on (1) the need to elaborate the four cooperation criteria; (2) the gradual recognition of the content of the criteria in the complex improvement of the study environment within the study course; and (3) the ability of the research participants to evaluate the changes in their experience, which occurred during the educational research process.

The idea of improving the programmes at VECC Daugavpils Vocational School has been matured for a long period of time as a personally significant need of instructors related to their professional development activity and as an important need for institutional development promoted by the development of education policy at the global and local levels, and in particular by the institution’s cooperation with various partners in terms of programme and institutional improvement.

Consequently, before the idea of an educational action research, the need to improve study courses and programmes has already been topical. At the initial stage, the action research into the study course was based on the tasks of the observational research: (1) to find out the participants’ opinions about the current situation; (2) to enable participants to agree on the criteria to be used in the research (2.1) in order to identify and visualise the trajectories of change and (2.2) for conceptualising the experience gained and conclusions, to integrate the individual feelings and those gained in teamwork into the visualised trends of the trajectory direction of action research assessment and (3) to find out the participants’ opinions about the situation and benefits upon the completion of the study course.

Initiating the research in the description of the situation, the participants noticed some of the essential features of the situation:
The study process was described as *tedious, pattern-like and reproduction-oriented process*. Generalising various views expressed in the surveys, interviews and discussions, the characteristics mentioned by the participants were within the framework of the present unsustainable education;

In the opinions expressed by the students, their interests were mainly related to the *belonging to the peer group, the problems of out-of-school life (family, financial, dormitories, etc.)* followed by the need for professional development;

The interest in professional development revealed that in students’ interest there was room for peculiar *either, or* where it appeared that students experienced a lack of *either* fundamental knowledge *or* the skills to use the acquired knowledge in problem solving.

At the beginning of the research, the participants examined their experiences and beliefs, and set up criteria that, in their opinion, could be used to identify the phenomenon of cooperation. Four criteria for recognising the phenomenon of cooperation were distinguished:

- **Teamwork**, observed by recognising the cooperation commitment, which was manifested as the team unity to a greater or lesser degree;
- **Cooperative learning**, recognised by the participants in terms of the visible features of the action process of experience and knowledge exchange, especially after engagement in solving problems arising from learning activities;
- **Business communication**, recognised by features of individual responsibility for particular assignments and responsibility for assigning the team roles, which demonstrated an apparent change in the perception of the organisation of a professional railway transport process;
- **Creative activity**, recognised by the ability to find innovative and original solutions based on the combination of existing experience and knowledge for the individual and the group in the attained perspective of the perception of the world, the concentration of action and thinking habits on the issue that challenges the ability to integrate experience, knowledge, action habits by concentrating one’s own ability and opportunity (individual and team) to synthesise creative solutions in the holistic perspective thus obtained.

At the end of the observational action research or upon the completion of the study course:

- The participants evaluated the most useful skills, knowledge and the change in the cooperation skills, where the dominant skills were the ability to read and draw drawings – electrical circuits, maintain locking devices, plan different routes, place and transfer consignment, make financial calculations, comply with the occupational safety, electrical safety and fire safety regulations;
- The participants also identified the knowledge and skills that seemed necessary in the future professional activity, but they lacked them during the acquisition of the study course, e.g., the ability to fill in technical documentation, perform maintenance of equipment and serve electrical equipment stations etc., which indicated students’ interest in acquiring practical skills.

The research design provided the characteristics of the three groups of participants who acquired the study course “Railway Technical Operations Regulations” and, within the educational action research, cooperated to investigate the opportunities for improvement of the study environment within the study course.
In the two groups, all participants had the opportunity to work with the interest that they sought within themselves and developed in cooperation. The third group was offered a variant where the proposals to engage in the action research and to solve important issues of their life were made by the instructor and through them the students formed their opinion on using the content of the action research and cooperation opportunities.

At the beginning of the research, for *the developed cooperation phenomenon recognition criteria* used by the participants of the three groups, four criteria were applied, to which the levels of manifestation recognisable in the cooperation process were allocated: (0) did not participate, (1) participated partly, (2) participated with interest, (3) fully engaged in the process.

We used the cooperation phenomenon recognition criteria to visualise the recognition of this phenomenon at the beginning and the end of the research, when the acquisition of the study course was completed. Figures below provide the opportunity to observe trends in the range from non-involvement to full involvement in the process, which were identified at the beginning and the end of the research.

**Group 1**

![Fig. 1. Teamwork](image1)

![Fig. 2. Cooperative learning](image2)

![Fig. 3. Business communication](image3)

![Fig. 4. Creative activity](image4)

In the present educational action research, trends were obtained in each of the groups involved in the research. In Group 1 (n=23), at the beginning of the research in terms of *teamwork* (Fig. 1) there was non-engagement and partial involvement of participants observed and at the end of the research growing interest and partial involvement of participants was identified; in terms of *cooperative learning* (Fig. 2) partial cooperation and non-engagement predominated at the beginning of the research, and at the end of the research there was a tendency to act on the basis of interest and full
In terms of business communication (Fig. 3), at the beginning of the research, there were non-engagement and partial involvement and at the end of research interest and full involvement observed; and in terms of creative activity (Fig. 4) at the beginning of the research there were non-engagement and partial involvement, and interest and full involvement – at the end of the research.

Group 2

In Group 2 (n=22), at the beginning of the research, in terms of teamwork (Fig. 5) interest was dominant and full involvement was observed at the end of the research; in terms of cooperative learning (Fig. 6) at the beginning of the research partial engagement was more characteristic and at the end of the research interest and full engagement were observed; in terms of business communication (Fig. 7) at the beginning of the research non-engagement was observed and full involvement with interest in the action was dominant at the end of the research; in terms of creative activity (Fig. 8) at the beginning of the research there was a tendency not to participate, and at the end of the research there was a tendency to engage with interest and fully participate.

In Group 3 (n=22), in terms of teamwork (Fig. 9) at the beginning of the research engagement with interest was dominant, and at the end of the research there was a slightly greater tendency not to engage or partially engage; in terms of cooperative learning (Fig. 10) both at the beginning and the end of the research there was a tendency to partially engage; in terms of business communication (Fig. 11) at the beginning and the end of the research there was a tendency not to engage; and in terms of creative activity (Fig. 12) both at the beginning and the end of the research there was a dominant tendency not to engage.
The following conclusions on the findings of the research trends have been made by generalising the obtained data based on a qualitative assessment method:

- According to the teamwork criterion, at the beginning of the research process the activity of Group 1 was more based on partial participation, but at the end of the research they were acting on an interest basis. At the beginning of the research, Group 2 was relying on interest rather than engagement in teamwork, but at the end of the research, they acknowledged that there was a real engagement in the teamwork. At the beginning and the end of the research, Group 3 either partially engaged in the teamwork or did not engage at all.

- According to the cooperative learning criterion, it can be observed that the participation of Group 1 in the action research was based on partial involvement and non-engagement, at the end of the research it was based on interest and full involvement; at the beginning of the research the participation of Group 2 was based on partial involvement and non-engagement, but at the end of the research they recognised that they acted on the basis of interest and full involvement. At the beginning and the end of the research, the activity of Group 3 was based on partial involvement or non-engagement in the cooperative learning process.

- By generalising the data on business communication criterion, it became apparent that Group 1 was partially involved or did not participate in the process at the beginning of the research, but at the end of the research they demonstrated partial involvement or interest. At the beginning of the research,
Group 2 engaged with interest or did not engage at all, but at the end of the research they worked on the basis of partial involvement or interest. At the beginning and the end of the research, Group 3 demonstrated non-engagement or partial involvement.

- By generalising the data on the creative activity criterion, it was observed that at the beginning of the research Group 1 participated based on interest and non-engagement, but at the end of the research, they acted on the basis of interest and full involvement. At the beginning of the research, the activity of Group 2 was based on non-engagement and interest, but at the end of the research it was recognised that the activity was carried out with interest and full involvement. The results of Group 3 demonstrated that at the beginning and the end of the research, creative activity was based on the involvement and partial involvement of participants.

The involvement of Group 3 in the educational action research demonstrated that the data of all four cooperation criteria indicated the tendency for participants’ engagement to be based on partial involvement or non-involvement. This is evident in all the criteria as the fluctuations between these two forms of partial involvement or non-involvement and within the research in Group 3, in just a few cases, the participants’ activity was based on the interest in participating in a joint action.

The research demonstrated the tendency for an activity in an educational action research to be organised in such a way as to enable participants to find the basis of their involvement, by associating it with their life deep-seated issues and their interest in acquiring the study course.

The trends observed in the research indicate that the organisation of activities in Groups 1 and 2 was based on a more holistic approach and it had more opportunities to rely on the participants’ personal involvement and full involvement in the educational process. A more holistic educational action research opens up the opportunity of wider use of methods that affect deeper engagement, and the choice of these methods comes from participants as a demand for more dynamic methods related to deeper engagement.

Conclusions

The theoretical foundation of the research highlights the topicality of education for sustainable development. Development of a broader framework is based on the authors’ pedagogical and research experience, focusing on the choice of pedagogical approaches and methods that are related to the sustainability phenomenon and transformation of education into education for sustainable development.

A holistic understanding of sustainability phenomenon in the article is reflected as a need and condition for choosing new perspectives in education. Broader perspective of the framework is considered in terms of a complex approach that is non-linear and completely unpredictable.

The development of a broader framework calls for the evolution of consciousness as a complex task, in which the goal of the pedagogical mission is viewed from the perspective of intergenerational commitment and of generational development, and considered as a search of the direction of sustainable development. The present article addresses the issue of the choice of pedagogical approaches and methods in a broader framework that is created around the concepts of education for sustainable development,
generational development and intergenerational interaction in sustainable or unsustainable direction.

The focus of the research has been the today’s Generation Z that lives in the technology age and is represented by completely different people with a completely different mindset and different perception of the world compared to the previous generations, which calls for a completely different organisation of the study environment and requires developing more creativity, autonomy and critical thinking in the culture that is different, unknown and incomprehensible.

Acknowledgement

The authors of the article would like to express their greatest acknowledgement to professor Ilga Salite for her mentoring, support and inspiring while conducting this research. A special gratitude we give to our professor Ilga Salite for stimulating suggestions and coordination of this research project as well as in guiding the team in achieving the goal. Furthermore, we would also like to acknowledge Hussein Meihami with much appreciation for helping with the language issues.

References


