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# Investigation of the effect of school administrators' thoughts for change on 21st century skills

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**ABSTRACT**
The aim of this study is to examine the effect of school administrators' tendencies towards change, working in primary schools, on 21st century skills. The research is an example of the relational screening model. In this context, the sample of the research consists of 148 school administrators working in primary schools in 5 districts of the TRNC, namely Nicosia, Girne, Famagusta, Güzelyurt and Lefke. The research was evaluated with 107 people from 148 managers, with 95% confidence level and 5% sampling error. In this study, the "Multidimensional 21st Century Skills Scale" was used with the permission of the authors to measure the 21st century skills of school administrators and their tendencies towards change. In addition, the scale named "Adaptation of the change tendencies scale for teachers" was used. As a result of the research, it was revealed that there were significant correlations between the scores obtained from the sub-dimension of resistance to change in the Managers' Tendency to Change Scale and the scores acquired from the Multidimensional 21st Century Skills Scale and the Information and Technology Literacy Skills sub-dimension in the scale. These correlations are positive, and as the scores obtained from the sub-dimension of resistance to change in the Managers' Tendency to Change Scale increase, the scores obtained from the Multidimensional 21st Century Skills Scale and from the Information and Technology Literacy Skills sub-dimension in the scale also increase.

**Keywords:** 21st century skills, change, change trends, school administrators

## 1. INTRODUCTION

The 21st century shows itself with rapid advances in many different fields such as production, technology, art and health (Akkoyunlu, 2008). The rapid and gradual progress of technology in the 21st century, as it began to take place in every part of human life, has led societies to change constantly. In this context, technological developments have led to changes not only on machines but also in the abilities and skills of individuals living in society. Born in the conditions of the 21st century and called the "Z-generation", it is seen as a key point and inevitable situation for this generation to keep up with today's conditions and develop different abilities and skills as a part of society.

Change is defined as a desired action towards the final state of an object or individual (Balcı, 2005). Researchers define it as the difference in population factors and the relationship between these components in regard to the prior circumstances (Demirtaş and Güneş, 2002; Balcı, 2005). Any system, process, or environmental transition from one state to another is defined as change (Özdemir, 2000). According to Fullan (2005), change is a nonlinear, complex, and uncertain process. In fact, it is stressed that the more complicated the change, the more difficult the procedure will be.

Today, the internet has an important role in education of children and daily life (Tamilchelvi & Senthilnathan, 2013). Due to the continuous development of the Internet, the ease of access to information has increased and individuals have found the opportunity to share and obtain information on the Internet. As a result, while there has been a rapid increase in the scope of digital information, the reliability of this information has decreased (Van der Kaap & Schmidt, 2007).

In this environment, which can also be called "information pollution", teachers have great duties (Uluyol & Eryılmaz, 2015). The link between academic performance and technology is getting stronger, but this requires the acquisition of 21st century skills. The rise of information and communication technology, the Internet, and all technologies based on it has had a significant impact on the rapid advancement of technology (Onderwijsraad, 2014). Higher standards for children and adults have been developed as a result of these

advancements. Various teaching and learning objectives are required by learning materials (Voogt et al., 2013). Most research focuses on knowledge, skills, and personal attitudes and qualities related to a rapidly changing society. In general, skills are called 21st century skills, but they are the skills that stand out today (Thijs et al., 2014).

The scope of the mentioned 21st century skills is called critical thinking, information literacy, creative thinking, problem solving, media literacy, ICT skills, communication, social and cultural literacy, cooperation, flexibility, adaptability, leadership, entrepreneurship, self-direction and responsibility (Abad Alcalá, 2019; Petranova, 2013; Livingstone et al., 2012; Talebia & Javidi, 2022). This research aimed to examine the effect of school administrators' tendencies towards change working in TRNC primary schools on 21st century skills.

### 1.1. 21st Century Skills

In the changing understanding of education, not only providing direct information to students, but also how students can access information, how and where they will use the obtained information has come to the fore and studies are being carried out on this subject (Kalemkuş, 2020).

Different theories and models have been put forward to meet the needs at the national and international level in order to develop the individuals needed in the 21st century (Taş, Arıcı, Ozarkan, & Özgürlük, 2016). Acquiring 21st Century Skills is of great importance at both national and international levels. Acquiring these skills will enable students to compete in the global market and develop proactive methods to deal with problems in the future, while helping them develop a positive attitude to become effective individuals (Tuğluk & Altın, 2018).

In the framework known as P21 (Partners for 21st Century Skills) created by various institutions, organizations and companies working together in the United States; students should be successful in professional and daily life. 21st century skills; It consists of thinking, working, tools and ways of integrating with the world. way of thinking; Be creative and innovative by using the sub-categories of learning strategies, problem solving, critical thinking and decision making. Way of working; communication skills, teamwork. Working tools include information and technology literacy, global integration including life and career awareness, social responsibility awareness, and universal and local citizenship elements (Çepni, 2018).

### 1.2. Change Strategies in Education

The skills gap has led to a focus on education-based reforms. Also, the lack of opportunities for students to practice their skills outside of school is a major concern. It is important to provide real opportunities for young people to develop skills like as responsibility and independence (Scott et al., 2015). In addition, it enables them to engage with adult role models by developing social capital, creating informal networks, and promoting good habits (Stoll et al., 2003). The focus of education is to prepare students for modern learning and develop qualifications to become global citizens. Schools are expected to change the learning environment and bring radical changes in student outcomes.

To transform education across the board, a new educational paradigm for the twenty-first century must be guided by a comprehensive roadmap that includes curriculum and assessment reforms, new teacher recruitment and training strategies, leadership development, and the integration of collaborative technologies. The ability and motivation to read, identify, grasp, and interpret information, learn, and communicate using written materials relevant to changing situations in a changing environment are all aspects of literacy in the twenty-first century. It is effective for school leaders to exchange information on 21st century skills to be taught in classrooms with their communities and stakeholders. Changes in pedagogy, curriculum, assessment, and policy are all necessary for revolutionary education. Highly qualified leaders who can (a) support strong-minded personnel, (b) make significant changes to foster collaboration, inspire creativity, and construct a continuous cycle of continuous improvement, as well as develop school culture, are required to manage these changes.

## 2. METHODOLOGY

In this study, which examines the effect of school administrators' tendencies towards change working in primary schools on 21st century skills, a quantitative research model, one of the research models, was adopted. In the research, scanning model was used. The scanning model is one of the quantitative research methods. The sample of this research consists of 148 school administrators working in primary schools in 5 districts of TRNC, namely Nicosia, Girne, Famagusta, Güzelyurt and Lefke. In this context, 107 people from 148 managers were interviewed with a 95% confidence level and 5% sampling error. The participants will be school administrators working in primary schools who were selected by simple random sampling method and willing to participate in the study voluntarily.

As a data collection tool, the "Multidimensional 21st Century Skills" scale and "Adaptation of the change tendencies scale for teachers" was used. The Multidimensional 21st Century Skills prepared by Çevik and Şentürk (2019) and Adaptation of the change tendencies scale for teachers scale prepared by Büyüköztürk, Uslu and Akbaba Altun (2017).

The 24th version of the Statistical Package for Social Sciences (SPSS) software was used for the statistical analysis of the research data. Before the analysis of the research data, Cronbach's Alpha test was performed for the reliability of the answers given by the managers to the Tendency to Change Scale and the Multidimensional 21st Century Skills Scale, and the alpha coefficients were found to be 0.886 and 0.910, respectively. The alpha coefficients obtained indicate a high degree of reliability for both scales. If $0.80 \leq \alpha < 1.00$, the scale is highly reliable (Büyüköztürk et. al, 2011; Creswell & Creswell, 2017).

## 3. Findings

**Table 1. Scores of Administrators from the Tendency to Change Scale**

| | n | $\bar{x}$ | s | Min | Max |
|---|---|---|---|---|---|
| Entrepreneurship in change | 107 | 24,63 | 6,36 | 14 | 48 |
| Resistance to change | 107 | 28,15 | 4,07 | 22 | 37 |
| Believing in the benefit of change | 107 | 20,59 | 5,49 | 12 | 37 |
| Maintaining the Status Quo | 107 | 6,94 | 2,53 | 4 | 17 |
| Tendency to Change Scale | 107 | 80,31 | 13,95 | 53 | 127 |

Table 1 presents the descriptive statistics of the scores obtained by the managers from the Tendency to Change Scale. Table 1 showed that the managers included in the research have an average of 24.63±6.36 points from the sub-dimension of entrepreneurship in change in the Change Tendency Scale, an average of 28.15±4.07 points from the sub-dimension of resistance to change, and an average of 28.15±4.07 points from the sub-dimension of believing in the benefit of change. it was determined that they got an average of 20.59±5.49 points and an average of 6.94±2.53 points from the sub-dimension of maintaining the status quo. It was determined that the Managers received an average of 80.31±13.95 points from the Scale of Tendency to Change, and the lowest score was 53 and the highest score was 127.

**Table 2:Scores of Managers from the Multidimensional 21st Century Skills Scale**

| | n | $\bar{x}$ | s | Min | Max |
|---|---|---|---|---|---|
| Information and Technology Literacy Skills | 107 | 23,35 | 6,73 | 15 | 43 |
| Critical Thinking and Problem Solving Skills | 107 | 10,19 | 3,08 | 6 | 18 |
| Entrepreneurship and Innovation Skills | 107 | 23,76 | 7,27 | 14 | 48 |
| Social Responsibility and Leadership Skills | 107 | 7,02 | 2,40 | 4 | 14 |
| Career Awareness | 107 | 8,45 | 2,80 | 6 | 18 |
| Multidimensional 21st Century Skills Scale | 107 | 72,76 | 15,58 | 46 | 112 |

In Table 2, descriptive statistics regarding the scores of the managers included in the study from the Multidimensional 21st Century Skills Scale are given. According to Table 4.9., an average of 23.35±6.73 points from the Information and Technology Literacy Skills sub-dimension in the Multidimensional 21st Century Skills Scale of the managers participating in the research, and an average of 10.19±3 from the Critical Thinking and Problem Solving Skills sub-dimension. It was determined that they scored 08 points, 23.76±7.27 points from the Entrepreneurship and Innovation Skills sub-dimension, 7.02±2.40 points from the Social Responsibility and Leadership Skills sub-dimension, and 8.45±2.80 points from Career Awareness. It was determined that the managers got 72.76±15.58 points from the Multidimensional 21st Century Skills Scale, with the lowest score being 46 and the highest score being 112.

**Table 3. Comparison of the scores obtained from the Multidimensional 21st Century Skills Scale according to the gender of the administrators**

| | Gender | n | $\bar{x}$ | s | M | SO | Z | p |
|---|---|---|---|---|---|---|---|---|
| Information and Technology literacy skills | Female | 37 | 22,49 | 7,17 | 22,00 | 49,23 | -1,171 | 0,241 |
| | Male | 70 | 23,80 | 6,49 | 24,00 | 56,52 | | |
| Critical Thinking and Problem Solving skills | Female | 37 | 10,86 | 2,73 | 11,00 | 62,27 | -2,029 | 0,042* |
| | Male | 70 | 9,83 | 3,21 | 9,00 | 49,63 | | |
| Entrepreneurship and Innovation skills | Female | 37 | 21,92 | 6,62 | 20,00 | 46,89 | -1,730 | 0,084 |
| | Male | 70 | 24,73 | 7,45 | 24,00 | 57,76 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Social responsibility and Leadership skills | Female | 37 | 6,78 | 2,77 | 5,00 | 49,96 | -0,996 | 0,319 |
| | Male | 70 | 7,14 | 2,19 | 8,00 | 56,14 | | |
| Career Awareness | Female | 37 | 8,41 | 2,72 | 6,00 | 52,86 | -0,292 | 0,770 |
| | Male | 70 | 8,47 | 2,86 | 7,00 | 54,60 | | |
| Multidimensional 21st century Skills Scale | Female | 37 | 70,46 | 16,45 | 67,00 | 49,20 | -1,164 | 0,244 |
| | Male | 70 | 73,97 | 15,07 | 72,00 | 56,54 | | |

*p<0,05

Table 3 shows the results of the Mann-Whitney U test when comparing the scores were obtained from the Multidimensional 21st Century Skills Scale based on the gender of the administrators. Table 3 shows that there is no statistically significant difference between the managers' scores on the Multidimensional 21st Century Skills Scale in general and the sub-dimensions of Critical Thinking and Problem Solving Skills, Information and Technology Literacy Skills, Social Responsibility and Leadership Skills, Career Awareness, Entrepreneurship and Innovation Skills, according to gender. The difference in the scores of the Critical Thinking and Problem-Solving Skills sub-dimension in the Multidimensional 21st Century Skills Scale was shown to be statistically significant depending on the gender of the administrators.

**Table 4. Comparison of the scores of the managers from the Multidimensional 21st Century Skills Scale by age group**

| | Age Group | n | $\bar{x}$ | s | M | SO | $X^2$ | p |
|---|---|---|---|---|---|---|---|---|
| Information and Technology | 40 years and below | 40 | 22,03 | 5,46 | 22,00 | 48,44 | 3,354 | 0,187 |
| literacy | 41-50 years | 45 | 23,56 | 7,55 | 22,00 | 54,40 | | |
| skills | 51 years and above | 22 | 25,32 | 6,83 | 27,00 | 63,30 | | |
| Critical Thinking | 40 years and below | 40 | 9,55 | 2,75 | 10,00 | 47,93 | 3,263 | 0,196 |
| and Problem Solving | 41-50 years | 45 | 10,38 | 3,00 | 10,00 | 55,36 | | |
| skills | 51 years and above | 22 | 10,95 | 3,68 | 12,00 | 62,27 | | |
| Entrepreneurship and | 40 years and below | 40 | 25,28 | 8,02 | 25,50 | 58,16 | 2,182 | 0,336 |
| Innovation | 41-50 years | 45 | 22,24 | 6,64 | 21,00 | 48,84 | | |
| skills | 51 years and above | 22 | 24,09 | 6,73 | 25,00 | 56,98 | | |
| Social responsibility | 40 years and below | 40 | 7,45 | 2,18 | 8,00 | 59,73 | 2,356 | 0,308 |
| and Leadership | 41-50 years | 45 | 6,69 | 2,73 | 6,00 | 49,72 | | |
| skills | 51 years and above | 22 | 6,91 | 2,00 | 7,50 | 52,34 | | |
| | 40 years and below | 40 | 7,78 | 2,27 | 6,00 | 47,76 | 2,930 | 0,231 |
| | 41-50 years | 45 | 8,82 | 2,93 | 7,00 | 57,37 | | |
| Career Awareness | 51 years and above | 22 | 8,91 | 3,26 | 7,50 | 58,45 | | |
| Multidimensional | 40 yaş ve altı | 40 | 72,08 | 14,77 | 69,00 | 53,38 | 1,638 | 0,441 |
| 21st century | 41-50 yaş | 45 | 71,69 | 15,27 | 72,00 | 51,01 | | |
| Skills Scale | 51 yaş ve üzeri | 22 | 76,18 | 17,75 | 77,00 | 61,25 | | |

Table 4 shows the Kruskal-Wallis H test results regarding the comparison of the scores of the managers participating in the research from the Multidimensional 21st Century Skills Scale by age group. Table 4.11. When it is examined, there is a statistical difference between the scores obtained by the managers from the Multidimensional 21st Century Skills Scale in general and the Critical Thinking and Problem Solving Skills, Information and Technology Literacy Skills, Social Responsibility and Leadership Skills, Career Awareness, Entrepreneurship and Innovation Skills, sub-dimensions according to the age group. no significant difference was found (p>0.05).

**Table 5. Comparison of the scores obtained from the Multidimensional 21st Century Skills Scale according to the professional seniority of the managers**

| | Professional seniority | n | $\bar{x}$ | s | M | SO | Z | p | Differ |
|---|---|---|---|---|---|---|---|---|---|
| Information and Technology literacy skills | 15 years and under | 30 | 21,80 | 6,88 | 22,00 | 45,60 | 6,716 | 0,035* | 1-2 |
| | 16-25 years | 36 | 25,44 | 6,21 | 28,50 | 64,32 | | | |
| | 26 years and above | 41 | 22,63 | 6,77 | 21,00 | 51,09 | | | |
| Critical Thinking and Problem Solving skills | 15 years and under | 30 | 9,40 | 2,88 | 9,00 | 45,73 | 6,194 | 0,045* | 1-2 |
| | 16-25 years | 36 | 11,14 | 3,00 | 11,00 | 63,85 | | | |
| | 26 years and above | 41 | 9,93 | 3,15 | 9,00 | 51,40 | | | |
| Entrepreneurship and Innovation skills | 15 years and under | 30 | 27,10 | 7,66 | 28,00 | 66,63 | 7,575 | 0,023* | 1-2 |
| | 16-25 years | 36 | 23,11 | 7,03 | 21,00 | 52,01 | | | 1-3 |
| | 26 years and above | 41 | 21,88 | 6,47 | 21,00 | 46,50 | | | |
| Social responsibility and Leadership skills | 15 years and under | 30 | 7,73 | 1,80 | 8,00 | 64,90 | 10,419 | 0,005* | 1-2 |
| | 16-25 years | 36 | 7,44 | 2,83 | 7,00 | 58,14 | | | 1-3 |
| | 26 years and above | 41 | 6,12 | 2,12 | 5,00 | 42,39 | | | |
| Career Awareness | 15 years and under | 30 | 8,23 | 2,69 | 6,50 | 52,53 | 0,144 | 0,930 | |
| | 16-25 years | 36 | 8,61 | 2,81 | 8,00 | 55,28 | | | |
| | 26 years and above | 41 | 8,46 | 2,93 | 7,00 | 53,95 | | | |
| Multidimensional 21st century Skills Scale | 15 years and under | 30 | 74,27 | 13,66 | 72,50 | 57,87 | 4,256 | 0,119 | |
| | 16-25 years | 36 | 75,75 | 14,15 | 72,00 | 59,65 | | | |
| | 26 years and above | 41 | 69,02 | 17,56 | 67,00 | 46,21 | | | |

*p<0,05

The Kruskal-Wallis H test results for the comparison of the scores obtained from the Multidimensional 21st Century Skills Scale according to the professional seniority of the school administrators participating in the research are as shown in Table 5. When Table 5 is examined, it has been determined that the difference between the scores of the managers in the the Critical Thinking and Problem Solving Skills, Information and Technology Literacy Skills, Social Responsibility and Leadership Skills, Entrepreneurship and Innovation Skills sub-dimensions in the Multidimensional 21st Century Skills Scale is statistically significant. ($p<0.05$).

The scores of those who have been a manager for 15 years or less in the Information and Technology Literacy Skills, Critical Thinking and Problem Solving Skills sub-dimensions in the Multidimensional 21st Century Skills Scale were found to be lower than those who have been a manager for 16-25 years. Those who have been in management for 15 years or less have higher scores in the Entrepreneurship and Innovation Skills sub-dimension than those who have been in management for 16-25 years and 26 years or more. In addition, the scores of those who have been managers for 26 years or more in the Social Responsibility and Leadership Skills sub-dimension are higher than those who have been managers for 15 years or less and 16-25 years. It has been determined that there is no statistical difference in the scores of the participants in the study on the basis of professional seniority in the Multidimensional 21st Century Skills Scale and Career Consciousness sub-dimension ($p>0.05$).

**Table 6. The relationship between the scores obtained from the Managers' Tendency to Change Scale and the Multidimensional 21st Century Skills Scale**

| | | Entrepreneurship in change | Resistance to change | Believing in the benefit of change | Maintaining the Status Quo | **Tendency to Change Scale** |
|---|---|---|---|---|---|---|
| Information and Technology literacy skills | r | 0,609 | 0,351 | 0,569 | 0,344 | 0,666 |
| | p | 0,000* | 0,000* | 0,000* | 0,000* | 0,000* |
| Critical Thinking and Problem Solving skills | r | 0,253 | 0,253 | 0,338 | 0,393 | 0,323 |
| | p | 0,008* | 0,914 | 0,000* | 0,000* | 0,001* |
| Entrepreneurship and Innovation skills | r | 0,725 | 0,118 | 0,604 | 0,524 | 0,698 |
| | p | 0,000* | 0,227 | 0,000* | 0,000* | 0,000* |
| Social responsibility and Leadership skills | r | 0,573 | 0,029 | 0,540 | 0,410 | 0,557 |
| | p | 0,000* | 0,769 | 0,000* | 0,000* | 0,000* |
| Career Awareness | r | 0,377 | 0,016 | 0,372 | 0,260 | 0,370 |
| | p | 0,000* | 0,874 | 0,000* | 0,007 | 0,000* |
| Multidimensional 21st century Skills Scale | r | 0,808 | 0,216 | 0,745 | 0,581 | 0,830 |
| | p | 0,000* | 0,026* | 0,000* | 0,000* | 0,000* |

In Table 6, the results of the Spearman test, which examines the relationships between the scores of the managers included in the research from the Tendency to Change Scale and the Multidimensional 21st Century Skills Scale, are given. When Table 6 is examined, the scores of the managers in the General Change Tendency Scale and the sub-dimensions of entrepreneurship in change, believing in the benefit of change and protecting the status quo in the scale, and Information and Technology Literacy Skills, Critical Thinking and Problem Solving Skills, in the Multidimensional 21st Century Skills Scale and the scale are examined. Positive correlations and statistically significant were found between the scores they got from the sub-dimensions of Social Responsibility and Leadership Skills, Career Awareness and Entrepreneurship and Innovation Skills ($p<0.05$). Accordingly, as the scores of the managers in the sub-dimensions of entrepreneurship in change, believing in the benefit of change and maintaining the status quo increase in the overall Tendency to Change Scale and in the scale, Information and Technology Literacy Skills, Critical Thinking and Problem Solving Skills, in the The scores of the Multidimensional 21st Century Skills Scale and its sub-dimensions Entrepreneurship and Innovation Skills, Career Awareness and Social Responsibility and Leadership Skills also increase.

In the study, it was revealed that there is a significant correlation between the scores of school administrators from the sub-dimension of resistance to change in the Tendency to Change Scale and the scores of the Multidimensional 21st Century Skills Scale and Information and Technology Literacy Skills ($p<0.05$). These correlations are positive, and as the scores of the managers in the sub-dimension of resistance to change in the Tendency to Change Scale increase, the scores they get from the Multidimensional 21st Century Skills Scale and the Information and Technology Literacy Skills sub-dimension of the scale also increase.

## 4. CONCLUSION AND RECOMMENDATIONS

In the study, it was aimed to examine the effect of primary school administrators' thoughts on change on 21st century skills, and in this direction, the participants' 21st century. analyzed their skills on the basis of gender, age and years of professional seniority. According to the gender of the participants, there was a significant difference in the overall 21st century skills scale. However, it has been revealed that there is a difference in critical thinking and problem solving, which are one of the sub-dimensions of the scale. It was determined that the problem solving and critical thinking skills of female managers were higher than male participants. Many studies in the literature reveal that 21st century skills of participants differ according to gender (Bozkurt & Çakır, 2016; Gözübüyük, 2019; Keskin & Yazar, 2015). In addition, in parallel with the results of the research, Karagöz and Dilekli (2018) determined that these skills of women are higher than men in their research. In addition, when the multidimensional 21st century skills of the managers participating in the research were examined according to age groups, it was found that there was no difference in the scale and its sub-dimensions.

Within the scope of the Multidimensional 21st Century Skills Scale, it was reviewed whether there was a difference according to the professional seniority of the participants. As a result of the analyzes, it was stated that the 21st century skills of the participants differ according to their professional seniority. It has been determined that the critical thinking and problem solving skills, information and technology literacy skills, which are the sub-dimensions of the scale, of those who have been in management for 15 years or less are at a lower level than managers with 16-25 years of professional seniority. On the other hand, it is seen that entrepreneurship and innovation skills of those who have less professional seniority and who have been in management for 15 years or less are at a higher level than other participants. In addition, it has been determined that the social responsibility and leadership skills of the participants who have been managers for 26 years or more are higher than those who have been managers for 15 years or less and 16-25 years. When the literature is examined, Yılmaz (2021) concluded in his study that there is a significant difference in terms of professional seniority variable in the 21st century skills study of school principals according to the opinions of teachers. Similar to the research, it is stated that the skills of the participants with less seniority are higher than the other participants.

In line with the findings obtained in the study, it was obtained that there were positive and significant correlations between the scores obtained from the sub-dimensions of the relationship between school administrators' tendency to change and the scores of the 21st century skills scales. As the sub-dimension scores of the tendency to change scale increase, it is seen that the sub-dimension scores of the multidimensional 21st century skills scale increase. In the context of integrating the concept of change into different learning environments, it can be ensured that all stakeholders (curriculum development specialist, measurement and evaluation specialist, teacher and/or lecturer, national education representatives, students, etc.) carry out collaborative work and all stakeholders take part in practical projects.

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