ORIGINAL ARTICLE

Design and Validation of a Digital Literacy Model for Teachers of South Khorasan (Iran)

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Abstract

Aim: This study aimed to design and validate a digital literacy model for teachers in South Khorasan Province (Iran). This mixed-methods research was conducted with an exploratory design in qualitative and quantitative phases. Grounded theory was used in the qualitative phase, and confirmatory factor analysis was performed in the quantitative phase. All the components of the model were significant ($p<0.05$) and had adequate goodness of fit. Individual and collective needs make teachers tend to develop their digital literacy. The center of this trend is occupational and organizational motivations. The confounding factors include the short training time, too much content, and the teachers' level of literacy. The equipment provided by schools or the Education Department should lay the ground for fostering digital literacy. By using learner- and group-oriented strategies, teachers can develop their digital literacy. The outcomes of digital literacy formation include the teachers' professional growth and students' all-round development.
Keywords: *Validation; Digital literacy; Teachers; South Khorasan*

Introduction

In the 21st century, information and communication technologies (ICT) are rapidly growing and evolving. Gilster (1997) defined digital literacy as the ability to understand and use information in different formats from a wide variety of sources provided through computers (Spires et al., 2017, p. 2235). A review of the research into teachers' digital literacy shows that teachers do not have enough literacy in some digital skills. Meanwhile, to improve teaching performance and students' learning, it is necessary to improve the digital literacy of teachers. Teachers' lack of digital literacy is a barrier to their correct and appropriate use of technology in teaching and learning. As stated by Soifah et al., teachers' knowledge of technology, their attitude towards it, and their commitment to implementing students' digital literacy are obstacles to their implementation of digital literacy. Hassan and Mirza (2021, pp. 28-40) showed that the lack of computer skills among teachers is the main factor preventing the use of ICT in education.

Digital literacy is increasingly becoming a key competency for teachers in the 21st century. Still, the professional development of teachers is far from this emerging need, and thus efforts should be made to improve their skills in the digital age (Ranieri et al., 2017, p. 10). Teachers' having sufficient and appropriate digital literacy requires the provision of efficient and up-to-date training on this subject. Efficient and

comprehensive education demands the design of a model for this purpose. Therefore, this study aimed to design and validate a digital literacy model for teachers and sought to answer the following questions:
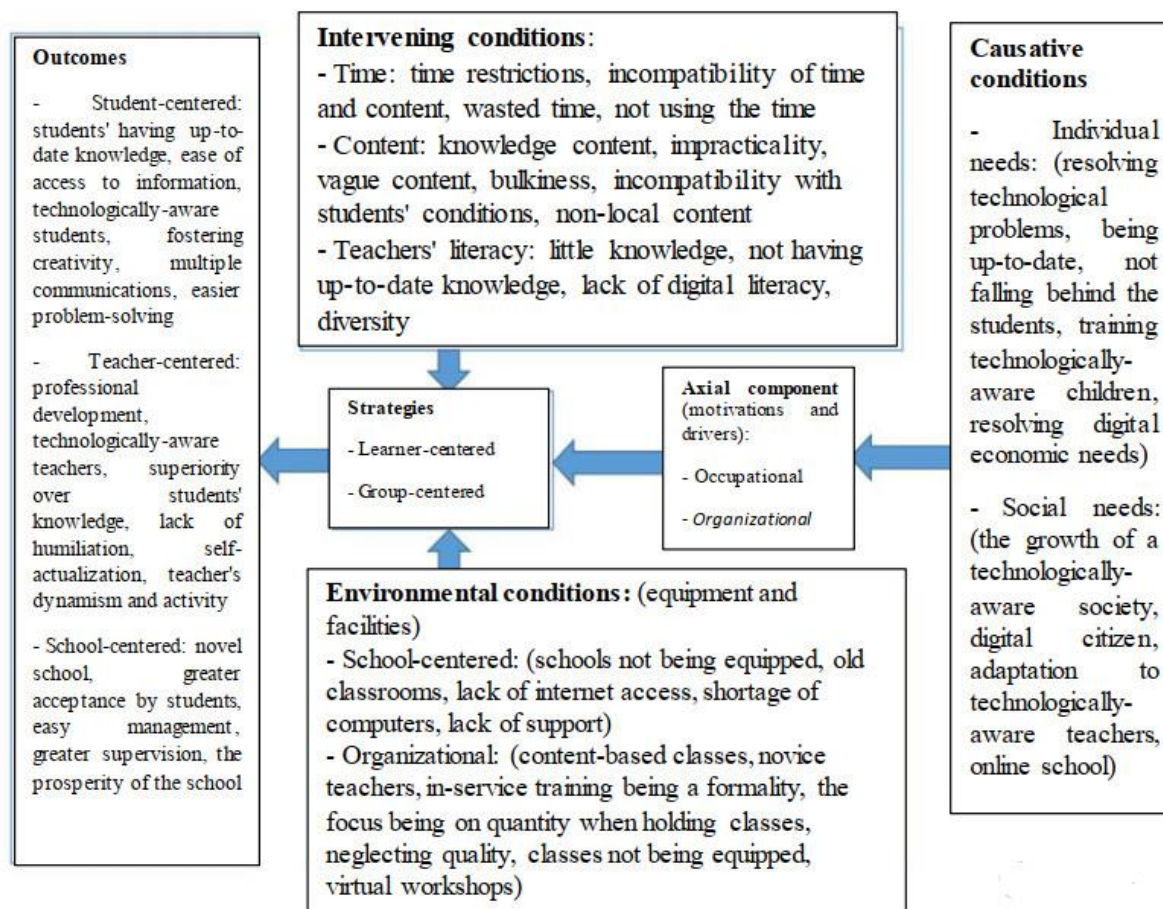
1. What are the characteristics of the digital literacy model of teachers in South Khorasan Province?

2. How valid is the digital literacy model of teachers in South Khorasan Province?

Methodology

This study sought to design and validate the digital literacy model of teachers in South Khorasan Province. To this end, a mixed-methods research with an exploratory design was conducted in qualitative and quantitative phases. In the qualitative phase, the statistical population included educational technology experts and elementary and high-school teachers; in the quantitative phase, the population included all the teachers of South Khorasan Province working in the academic year 2021-2022. At the outset and in the qualitative phase, through ground theory and based on purposive sampling, interviews were conducted with 22 educational technology experts (n=5), high-school teachers (n=8), and elementary school teachers (n=9) until theoretical data saturation. The data were analyzed in three phases of open, axial, and selective coding, and the characteristics of the theoretical model of teachers' digital literacy were extracted. To ensure the trustworthiness of the qualitative findings, Lincoln, & Guba's (1985) criteria of credibility, dependability, confirmability, and transferability were used. In the quantitative phase, these components were incorporated into a questionnaire, and after experts checked its face and content validity, it was administered to 375 high school and elementary school teachers in the cities of the province (selected via cluster sampling and based on Morgan's table). Finally, its validity and reliability were evaluated.

Results

Based on the findings, individual and collective requirements of 21st-century life make teachers tend to develop their digital literacy. The center of this trend is occupational and organizational drivers and motivations. The conditions and factors interfering with the growth of teachers' digital literacy include the short training time, bulky and impractical content, and the teachers' level of literacy. School and organizational equipment and facilities can provide the environmental conditions and factors necessary for the fostering of digital literacy. By using learner- and group-centered strategies such as participating in lesson study and action research festivals, teachers can develop their digital literacy. The outcomes of the formation of digital literacy among teachers include teachers' professional growth, students' comprehensive development, and the development of innovative schools. Confirmatory factor analysis was used to check the construct validity of this model. The findings showed that all the components of the digital literacy model are significant ($p<0.05$) and have sufficient goodness of fit. Cronbach's alpha was used to check the reliability of the instrument, and the overall reliability coefficient was 0.90. The extracted questionnaire had good validity and reliability. Figure (1) displays the paradigmatic model of the digital literacy of teachers based on grounded theory.

Outcomes

- Student-centered: students' having up-to-date knowledge, ease of access to information, technologically-aware students, fostering creativity, multiple communications, easier problem-solving

- Teacher-centered: professional development, technologically-aware teachers, superiority over students' knowledge, lack of humiliation, self-actualization, teacher's dynamism and activity

- School-centered: novel school, greater acceptance by students, easy management, greater supervision, the prosperity of the school

Intervening conditions:
- Time: time restrictions, incompatibility of time and content, wasted time, not using the time
- Content: knowledge content, impracticality, vague content, bulkiness, incompatibility with students' conditions, non-local content
- Teachers' literacy: little knowledge, not having up-to-date knowledge, lack of digital literacy, diversity

Strategies
- Learner-centered
- Group-centered

Axial component (motivations and drivers):
- Occupational
- *Organizational*

Causative conditions

- Individual needs: (resolving technological problems, being up-to-date, not falling behind the students, training technologically-aware children, resolving digital economic needs)

- Social needs: (the growth of a technologically-aware society, digital citizen, adaptation to technologically-aware teachers, online school)

Environmental conditions: (equipment and facilities)
- School-centered: (schools not being equipped, old classrooms, lack of internet access, shortage of computers, lack of support)
- Organizational: (content-based classes, novice teachers, in-service training being a formality, the focus being on quantity when holding classes, neglecting quality, classes not being equipped, virtual workshops)

Figure 1. The paradigmatic model of teachers' digital literacy based on grounded theory

Discussion and conclusion

Since the individual and social needs of teachers necessitate their digital literacy, the Ministry of Education should lay the ground for the development of teachers' digital literacy by holding capacity-building courses. The Ministry should also provide material and spiritual stimuli and create an innovative and technological atmosphere in schools to improve teachers' tendency to develop their digital literacy. It is also suggested that the Ministry equip schools and technical in-service classes with technological facilities. Group-based strategies can be used to develop teachers' digital literacy, where teachers improve their technological literacy by joining official scientific groups. Accordingly, the Ministry should hold different lesson study, action research, and superior teaching model festivals in schools to develop teachers' digital literacy. These festivals should receive material and spiritual support and their quality should be improved.

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