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Presenting a Model for Education of the Unlimited Generation in the Realm of 2050

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A B S T R A C T

Objective: The present study aims to present a model for the education of the unlimited generation in the realm of 2050.

Methodology: This research is applied in nature and is conducted using an exploratory method. Data collection is performed using a mixed method (quantitative and qualitative). Data collection tools include interviews with experts through specialized Delphi method interviews and questionnaires. Following the questionnaire execution, data analysis in the qualitative section is conducted using coding methods (open, axial, and selective). In inferential analysis, data is analyzed using factor analysis.

Findings: The results indicated that the components: factors affecting the acquisition of professional competencies; professional planning; professional competencies; economic factors; actions of managers, policymakers, and educational planners; individual factors; groundwork and willingness to create change; social factors; physical factors; and finally, technological and virtual (technological) factors; were not excluded from the factor analysis process as none had a factor load less than 0.3.

Conclusion: Ultimately, all 10 components, along with their indicators, were accepted as the dimensions and components of the education model for the unlimited generation in the realm of 2050. The model fit indices in the factor analysis confirm the model's fit.

Keywords: *Unlimited Generation Education, Realm of 2050, 2050 Generation Education, Educational Model*

1   Introduction

The new generation requires a new and different set of skills compared to the previous generation. We should not fix them but rather utilize the new skills they bring to the classroom and nurture them. Our generation has been trained to value tradition in education, and we unconsciously believe that the digital generation's skills are not as good as ours and that they are not as literate as we are because they seemingly do not prioritize our literacies. We must realize that we are no longer in our world. This is a new digital world. We will not return to that time. As stakeholders in the education system, we must accept that the new world is full of technology, which has a profound impact on the thinking of children and adolescents. More than ever, the digital generation needs our guidance and wisdom to help shape a future that belongs to all of us (Montazer & Gashool Darehsibi, 2020; Parsakia, 2023).

The internet has changed society in a very short time. With the exponential increase in data being produced and processed, the speed of changes will also increase. Over the next 40 years, two main advancements will result from the significant changes in how we function with information. First, technology will advance at such a rate that devices like today's iPads will seem more like Memex than a superior engineering object. Second, since technology will be very powerful and accessible, the emphasis and focus will shift from the technology itself to how it is used (Nugroho et al., 2020; Zhang, 2023).

The concept of technology in the future will reveal a fundamental disconnect between how people perceive the world in the present and the future over time. These factors will present society with the issue of generational differences in learning, referring to the differences in attitudes and behaviors of children, adolescents, and young people compared to adults. Proponents of generational differences believe that a complete break or disconnection is essentially impossible because the socialization of each new generation occurs in the social space of its predecessor, and the new generation always carries a significant portion of the characteristics of the previous generation. Generational differences have been considered an obstacle to understanding between young people and adults in contemporary societies. This difference roots in globalization, rapid cultural transformations, and the expansion of new information and communication technologies that have changed the state of societies in the

West and the East since the past decades (Clark & Mayer, 2023; Esmaeeli et al., 2016).

However, establishing a suitable digital educational system for the unlimited generation requires considering many factors and events together. Negative factors such as reduced mental health, promotion of unethical values, social harm, increased physical harm, reduced educational quality, family issues, increased unproductive student behavior, student academic decline, teacher burnout, lack of educational justice, inadequate objective and practical evaluation, inefficient technical support of the network, lack of appropriate home environment for education, absence of a strategic plan for virtual education, family economic problems, the mismatch of virtual education with practical and laboratory courses, limited human interactions, lack of technological knowledge and acceptance, and the mismatch of virtual education content are present. Although virtual education and the use of modern media such as the internet and computers have created golden opportunities for individuals, the presence of obstacles and challenges is inevitable, and due to the lack of mandatory readiness for virtual education, all stakeholders have experienced significant problems (Meighan, 2021; Rohmiyati & Irhandayaningsih, 2018).

Howlers (2018) believes that future educational systems need the formation of learning agencies. Students prepared for the future must have autonomy in their education and throughout their lives. An agency ensures a sense of responsibility to participate in the world and, by doing so, influences people, events, and conditions for better learning outcomes. An agency needs the ability to frame a guiding goal and identify actions to achieve that goal. To help activate the agency, educators must not only recognize the individuality of learners but also accept a broader set of relationships with teachers, peers, families, and communities that affect their learning. This concept underlies the "collaboration" framework and creating supportive reciprocal relationships that help learners advance. In line with their valuable goals in this area, not only students but also teachers, school administrators, parents, and communities should all be considered learners. Two factors, in particular, help learners activate the agency. The first is a personalized learning environment that supports and motivates each student to cultivate their interests, connect different experiences and learning opportunities, and design their projects and learning processes in collaboration with others. The second is building a solid foundation: literacy and numeracy remain crucial. In the digital transformation

era, with the emergence of big data, digital literacy, data literacy, and physical health and mental well-being become increasingly essential (Anggraeni, 2023; Dridi, 2021; Haryanto et al., 2022; Perdana et al., 2019; Probowati, 2023; Solahudin et al., 2022).

Smart schools lacking developed IT infrastructure for students to access electronic content and utilize this type of content have one or more computer sites, lack appropriate and up-to-date laboratories, lack technical support, low level of school interaction for information exchange and experience transfer, lack standardization, and lack efficient managers (Dolati et al., 2016; Sadeghi et al., 2021).

Identifying the components and indicators of the education model for the unlimited generation in the realm of 2050;

Prioritizing each of the components and indicators of the education model for the unlimited generation in the realm of 2050;

Examining the current state of the education for the unlimited generation in the realm of 2050;

Providing suitable mechanisms to reduce the gap between the current state and the desired state of education for the unlimited generation in the realm of 2050;

Assessing the degree of fit of the education model for the unlimited generation in the realm of 2050.

2   Methods and Materials

Given that the aim of this research is to present a model for educating the unlimited generation in the realm of 2050, and since in applied research, the main goal is not merely scientific discovery but testing and examining the application of knowledge, the method of this research is applied. The results can be used by decision-making stakeholders. Therefore, it is conducted using an exploratory method, with data collection carried out quantitatively. The data collection tool is a questionnaire.

The statistical population includes experts, specialists, and knowledgeable individuals in the field of education with a future-oriented perspective (such as planners, policymakers, managers, etc.). The quantitative section of the statistical population comprises 747 individuals, from which 251 people were selected as the sample size according to Cochran's formula. In the qualitative section, a purposeful non-random sampling method was used for this group of experts. The characteristics of those to whom the Delphi questionnaire was sent included: 1) At least a master's degree, 2) A minimum of three years of executive experience

in a management position, 3) Familiarity with future-oriented educational literature. If the purpose of the interview is to explore and describe the beliefs and attitudes of the interviewees, then depending on available time and resources, a sample size of 10-25 can be used for the interviews (Abbasi et al., 2009, p. 15). In this research, 15 participants were considered the sample size in the qualitative section using the Delphi method.

Initially, to identify the components of educating the unlimited generation in the realm of 2050, the literature was studied, and existing scientific documents in this field were analyzed. Then, the importance of each component was examined through a researcher-made questionnaire to validate it. Finally, based on previously obtained information and the researcher-made questionnaire, the education of the unlimited generation in the realm of 2050 was evaluated.

The identified components influencing the education of the unlimited generation in the realm of 2050 are as follows:

- Factors affecting the acquisition of professional competencies
- Professional planning
- Professional competencies
- Economic factors
- Actions of managers, policymakers, and educational planners
- Individual factors
- Groundwork and willingness to create change
- Social factors
- Physical factors
- Technological and virtual factors

Since the questionnaire content shows components with the highest importance coefficient, and given the experts' validation of the questions, the content validity of the questionnaire was confirmed. To perform statistical tests to confirm the reliability or consistency of the questionnaire, Cronbach's alpha was calculated. Cronbach's alpha measures the degree of unidimensionality of attitudes, judgments, and other categories that are not easy to measure. The higher the positive correlation between questions, the higher the Cronbach's alpha will be, and conversely, the greater the average variance of questions, the lower the Cronbach's alpha will be. The results show that the overall alpha coefficient for the questionnaire on educating the unlimited generation in the realm of 2050 is 0.90 or 90%, indicating that the tool used has desirable reliability.

As stated, the research method, in terms of purpose, is fundamental-applied, in terms of data type, mixed (qualitative-quantitative) of the exploratory type; in terms of data collection time, cross-sectional; and in terms of data collection method or research nature and method, descriptive-survey. In mixed research methods, examining various aspects of qualitative and quantitative methods and combining them enables answering research questions in different areas. In this design, the researcher first qualitatively investigates the research topic with a limited number of participants and then constructs the desired tool based on qualitative findings. Considering the above and since the main goal of this research is to provide a suitable model for educating the unlimited generation in the realm of 2050, a thorough study of the literature and background related to the topic was conducted, and the initial indicators and components were identified (content analysis of literature and background). Then, the Delphi technique was used as a research technique to revise, confirm, reject, or add indicators and components for educating the unlimited generation in the realm of 2050 among experts, based on which the final questionnaire was developed. Finally, quantitative approaches (descriptive-survey) were used to confirm the qualitative results and test the model.

Factor analysis is a general term for some multivariate statistical methods whose main purpose is data summarization. This method examines the internal correlation of a large number of variables and ultimately categorizes and explains them into limited factors. Factor analysis is used to address problems such as reducing the volume of variables or creating a new structure for them. Based on empirical and practical criteria, factor analysis reduces the number of excessive variables to several factors, making their analysis easier. Factor analysis reduces variables to factors by grouping variables with moderate or relatively high correlation.

3 Findings and Results

An examination of the gender of the respondents in the sample shows that 38.2% (96 people) of the respondents are women, and 61.8% (155 people) are men; thus, male respondents are more frequent in this research. Additionally, an examination of the age of the respondents in the sample shows that 32.3% (81 people) are aged between 31-40 years, 50.6% (127 people) are aged between 41-50 years, and 17.1% (43 people) are aged 50 years and above. An examination of the educational level of the respondents in the sample shows that 37.8% (95 people) have a PhD, 38.6% (97 people) have a master's degree, and 23.5% (59 people) have a bachelor's degree. In terms of the service experience of the respondents in the sample, 17.1% have 6 to 10 years of experience, 15.1% (the lowest frequency) have 11 to 15 years of experience, 23.1% have 16 to 20 years of experience, and 44.6% (the highest frequency) have more than 21 years of experience.

In this research, the model for educating the unlimited generation in the realm of 2050 was examined qualitatively using qualitative content analysis and theoretical coding. In this section, the process of conducting interviews, data analysis steps in the form of open coding, axial coding, and selective coding, along with coding tables, were scrutinized. The process of theorizing using selective coding and the research narrative was explained, and finally, the desired research model was presented. To prepare specialized interview questions, the following steps were taken in collaboration with the supervisor and advisor and through feedback from experts and specialists: Step 1: Transcription of text, Step 2: Definition of analysis unit, Step 3: Development of categories and a coding scheme, Step 4: Pilot coding, Step 5: Full-text coding, Step 6: Assessing coding consistency, Step 7: Extracting results from coded data, Step 8: Reporting method and findings (extracting dimensions, components, and indicators), Step 9: Preparing and finalizing the expert and specialist questionnaire. These questions were then presented to experts and specialists, and the results were analyzed qualitatively using the Delphi method. The fundamental components of the model for educating the unlimited generation in the realm of 2050 were assessed and evaluated as follows.

Ultimately, based on the suggestions of experts and specialists and the agreement of the supervisor and advisor, the extracted components were evaluated under the following titles to examine the components and indicators for presenting a model for educating the unlimited generation in the realm of 2050. Below is a summary of the expert and specialist opinions on various components:

Table 1

Summary of Expert and Specialist Opinions Based on Coding by Components

Row	Identified Component Title	Frequency	Percentage	Valid Percentage

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1	Factors Affecting Professional Competency Acquisition	16	10.61	11
2	Professional Planning	13	11.94	12
3	Professional Competencies	13	10.46	10
4	Economic Factors	14	10.23	10
5	Actions of Managers, Policymakers, and Educational Planners	16	9.05	9
6	Individual Factors	18	9.03	9
7	Groundwork and Willingness to Create Change	13	10.49	10
8	Social Factors	12	9.01	9
9	Physical Factors	10	10.09	10
10	Technological and Virtual Factors	10	9.09	9
11	Total (Reviewed)	135	100	100
12	Missing	0	0	-
13	Total	135	100	-

According to the experts and specialists, the above components are approved for evaluation in the quantitative section as components and indicators for presenting a model for educating the unlimited generation in the realm of 2050. Below is the path coefficient information from the factor analysis output.

In the end, given the factor analysis model of indicators for determining the education of the unlimited generation in the realm of 2050, the "Unlimited Generation Education Model in the Realm of 2050" is presented as follows:
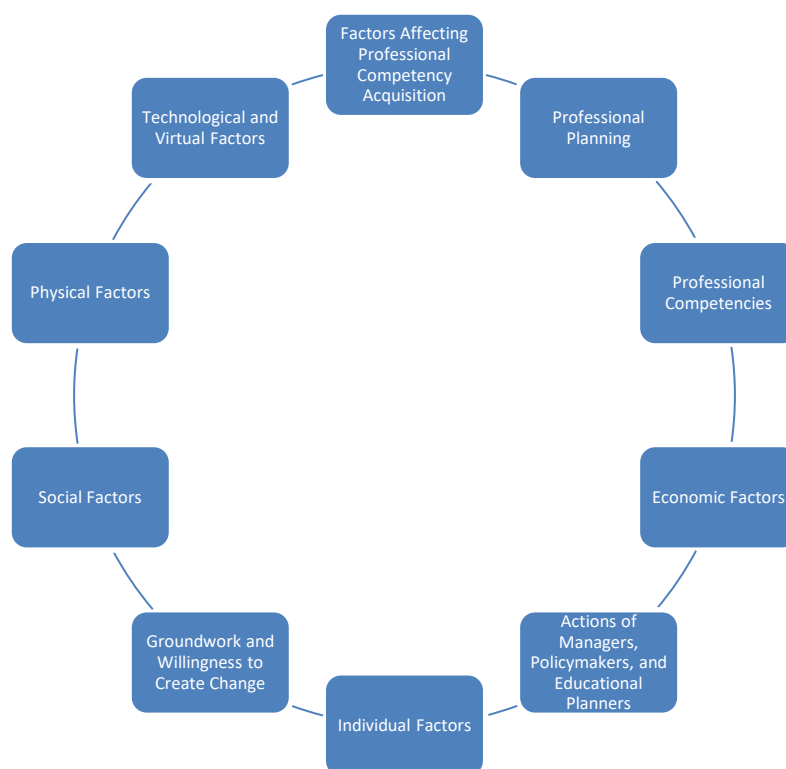
Figure 1

Final Model

Table 2

Path Coefficient from Factor Analysis Output

Row	Path	Path Coefficient	P
1	Factors Affecting Professional Competency Acquisition → Professional Planning	0.633	<0.01
2	Professional Planning → Professional Competencies	0.543	<0.01
3	Professional Competencies → Economic Factors	0.632	<0.01
4	Economic Factors → Actions of Managers, Policymakers, and Educational Planners	0.442	<0.01
5	Actions of Managers, Policymakers, and Educational Planners → Individual Factors	0.459	<0.01
6	Individual Factors → Groundwork and Willingness to Create Change	0.645	<0.01
7	Groundwork and Willingness to Create Change → Social Factors	0.711	<0.01
8	Social Factors → Physical Factors	0.691	<0.01
9	Physical Factors → Technological and Virtual Factors	0.552	<0.01
10	Technological and Virtual Factors	0.591	<0.01

4   Discussion and Conclusion

In this research, to present a model for the education needed by the unlimited generation in the realm of 2050, the overall issue, including the statement of the problem, the necessity and importance of the issue, questions, and objectives, was first addressed. Then, with the aim of preparing an educational system ready for changes in skills and future job requirements, a model for educating the unlimited generation in the realm of 2050 was examined, focusing on theoretical foundations and research literature around preparing the educational system for the future job market's needs. After conducting interviews and questionnaires in both qualitative and quantitative sections, the researcher aimed to answer the questions, analyze the data, and derive the factors, dimensions, and components of the model for educating the unlimited generation in the realm of 2050 from previous studies and research. The researcher then shared the obtained components with experts and specialists using the Delphi method, revised them, and obtained new components. Subsequently, the researcher examined all the obtained components from the qualitative analysis quantitatively through statistical and quantitative methods. The researcher then evaluated these factors, dimensions, and components in the questionnaire and assessed the factor loads using factor analysis. Since all factor loads were above 0.6, no factors were eliminated, and all components, along with their indicators, were accepted as the dimensions and components of the model for educating the unlimited generation in the realm of 2050.

After conducting confirmatory factor analysis, four high-priority factors emerged:

- Professional Competencies
- Professional Planning
- Factors Affecting Professional Competency Acquisition
- Economic Factors

In conclusion, the research results align with the prior findings (Anggraeni, 2023; Clark & Mayer, 2023; Dolati et al., 2016; Dridi, 2021; Esmaeeli et al., 2016; Haryanto et al., 2022; Meighan, 2021; Montazer & Gashool Darehsibi, 2020; Nugroho et al., 2020; Parsakia, 2023; Perdana et al., 2019; Probowati, 2023; Rohmiyati & Irhandayaningsih, 2018; Sadeghi et al., 2021; Solahudin et al., 2022; Zhang, 2023). Considering professional competencies, professional planning, factors affecting professional competency acquisition, and economic factors are crucial when designing a model for the future education of the unlimited generation of students. These factors can significantly impact the available resources, educational opportunities, and career paths accessible to students. In the professional competencies section, factors such as deep content knowledge, strong teaching skills, critical thinking skills, strong communication skills, creativity and innovation, commitment to educational equity, technological skills, lifelong learning; in the professional planning section, factors such as setting goals, identifying needed skills, developing a growth plan, finding learning opportunities, networking, reflection and evaluation, staying updated, seeking help; in the factors affecting professional competency acquisition section, factors such as individual factors (enthusiasm and commitment, personal skills, creativity and innovation, lifelong learning), educational factors (initial preparation, continuous professional development, mentoring and guidance), environmental factors (school and district support, collaboration with colleagues, community support); and in the economic section: globalization, economic stability, technological advancements, economic inequality, climate change,

government financial support in education should be considered. It should be noted that designing a model for the future education of the unlimited generation of students ensures that they acquire the necessary skills and knowledge to succeed in a constantly evolving global education landscape.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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