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The Effect of Interactive and Non-Interactive Multimedia Training on Citizenship Skills and Social Intelligence

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ABSTRACT

Objective: The primary aim of this study is to examine the impact of interactive and non-interactive multimedia education on the citizenship skills and social intelligence of sixth grade elementary school boys.

Methods: The research design employed in this study is semi-experimental, using a pre-test-post-test design with a control group. The study encompasses all primary boys' schools in the second period of Shiraz city, with a sample of 60 participants selected through available sampling, divided into two groups of 30 individuals (experimental group and control group). The research utilizes various instruments such as the citizenship skills questionnaire, the social intelligence scale, as well as interactive and non-interactive multimedia tools.

Results: The obtained data were analyzed using univariate and multivariate covariance analysis, revealing a positive and statistically significant impact of multimedia-based education on social intelligence, citizenship skills, and other factors including self-confidence, decision-making abilities, orderliness, responsibility, emotion control, conflict resolution, acceptance of others, ability to participate, and environmental preservation. Moreover, multimedia education demonstrates a positive and significant influence on social information processing and social awareness.

Conclusions: Consequently, this study demonstrates the potential of interactive and non-interactive multimedia education as an effective intervention for enhancing the citizenship skills and social intelligence.

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Introduction

In contemporary society, individuals who disregard the rights of others and exhibit a relentless pursuit of their desires, such as disobeying traffic laws, unnecessary honking, and neglecting environmental preservation, pose a significant challenge. When contemplating the root causes behind these societal issues, it becomes evident that their origins lie in the upbringing of these individuals. As children, they were not equipped with the necessary skills to become responsible citizens, which is now reflected in their behavior.

For a society to achieve substantial progress in social, economic, and political realms, it requires a healthy and educated population that is well-versed in their social, political, and citizenship rights. However, the cultivation of such awareness and achievement of citizenship rights cannot be achieved in a short timeframe, whether it be a year or even a decade. Rather, the education of citizenship rights should be institutionalized within various systems such as the family, education system (including schools, universities, and organizations), and other institutions. The education system, due to its long-term nature and comprehensive programs for children, adolescents, and young adults, holds a distinctive position compared to other governmental and non-governmental entities. Given the expectations of the education system to foster well-rounded individuals with a wide range of abilities, social and citizenship education assumes fundamental importance. In today's context, with factors like power decentralization, the rapid expansion of information technology, the concept of a global village, and global issues like environmental pollution, peace, and security, citizenship education has gained attention not only at the national and local levels but also at the international level (Zaraii Zavaraki, & Gharibi, 2012).

Education should play a pivotal role in nurturing responsible citizens, individuals who actively engage in social and cultural life, exhibit enthusiasm for learning, and display self-reliance and dependability. These individuals should not only possess values and admirable qualities sought after by society but also make concerted efforts to enhance and uplift the cultural fabric of society. Schools serve as crucial institutions where children and adolescents learn about their rights and responsibilities as citizens.

Therefore, the main mission and philosophy of the formation and development of schools in the current era can be justified by citizenship education. In other words, schools serve as institutions that aim to achieve the characteristics of citizenship and act as schools of life. Citizenship refers

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to the way of living in a city according to specific principles and rules. In today's context, the concept of citizenship has gained significant importance due to various factors such as the rise of the digital generation and changing expectations from educational systems. These factors have created a gap between capabilities, expectations, and ideals, thereby necessitating a different perspective on man, society, and the world. To address this, principled interventions and transformations in human assets have been made, leading to changes in the thoughts and beliefs of citizens. This transformation is only possible through the intervention of educational systems.

Furthermore, schools should focus on developing students' social intelligence, which is an essential ability for effective communication with others. Social intelligence is a non-cognitive aspect of intelligence that has been recognized since the time of Thorndike. He was one of the first proponents of non-cognitive aspects of intelligence and introduced social intelligence as a form of social ability (Yousefi and Khaier, 2002). According to Thorndike, social intelligence refers to the ability to understand others and behave wisely in social relationships (Kihlstrom, & Cantor, 2000).

In today's multimedia-driven world, the impact of multimedia on the audience is undeniable. It is not limited to educational software but is also extensively used in the production of games, digital media, advertising, and information dissemination. The rapid development of new technologies has revolutionized the teaching-learning process, and educational multimedia has emerged as a valuable tool in education (Zamani et al., 2013). Educational media can be broadly categorized into two types: non-interactive or one-way media, and interactive or two-way media. Non-interactive media involve the transmission of information from teachers to the audience in a one-way manner, such as animated films, slides, and television. These media have been in existence since the early years of the 20th century and gradually expanded until the late 1970s. On the other hand, interactive media create a two-way educational situation between the learner and technology, such as computers and information highways. These media are designed to elicit responses from learners and often provide feedback and evaluation of their answers (Shah Jaafari, 2006).

The impact of multimedia tools on behavioral and social structures has been the subject of various studies. Ito et al. (2008) conducted research at the University of California, examining the use of new multimedia tools among 800 high school teenagers over a period of 5000 hours. The researchers concluded that social networks, video sites, online games, mechanical tools, and mobile phones have become integral components of youth culture. The digital world has provided

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young people with opportunities to explore social norms and discover their interests, while also seeking independence and building their own identities.

Meelissen and Drent (2008) conducted group research titled "The effect of computer use on the attitude, motivation, and mathematical progress of elementary school students." Their results revealed that the experimental group showed significantly higher academic progress compared to the control group. However, there was no significant difference in terms of motivation and attitude between the two groups.

In their research titled "The use of advanced multimedia education compared to the traditional method in language teaching, in two groups of English speakers and non-English speakers," Silverman and Hines (2009) demonstrated that while multimedia education did not lead to an increase in value for non-English speakers, it had positive effects on English speakers. Multimedia education reduced the gap in the knowledge of educational words among children and improved their overall vocabulary.

Viner snd Engersul (2012) conducted a study that highlighted the opportunities provided by multimedia for learners. By increasing motivation to learn, multimedia enables learners to tackle challenging situations, solve complex problems, and collaborate with others. The use of multimedia and virtual reality environments can effectively enhance students' social and communication skills.

Savadpour and Rezaei (2014) investigated the effects of teaching concept maps integrated with multimedia in vocational and technical courses on students' learning and motivation. Their study focused on third-grade female students in Zanjan city. The findings indicated that concept maps were effective in improving knowledge-level learning performance. However, they did not significantly impact motivational beliefs and self-regulating learning strategies. The researchers concluded that multimedia can enhance the learning experience for students.

Mousavi et al. (2015) conducted a study to examine the efficacy of educational multimedia in enhancing students' social skills. The study employed a quasi-experimental approach and revealed that the average scores of the experimental group, who received multimedia-based instruction, were significantly higher than those of the control group, who received conventional training. Furthermore, a statistically significant difference was observed between the two groups in terms of the subscales of social skills, including appropriate social behavior, avoidance of unsocial

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behavior, avoidance of aggression and fighting, avoidance of superiority, and establishment of proper relationships with peers.

In order for citizenship education to be effective and beneficial in the modern era, it necessitates a comprehensive and precise plan, a professional and knowledgeable team, adequate and up-to-date educational tools and facilities, as well as a monitoring and evaluation system. Additionally, an effective system of incentives and penalties should be in place to define, elucidate, and implement all of these steps in the process of citizenship education (Shahtalebi & Qopanchi, 2012).

Given that information and communication technology is predominantly associated with computer usage in today's era, the advent of computer technology has widely embraced multimedia software. By providing a diverse and stimulating environment and fostering interaction with users, multimedia software facilitates a more effective and profound understanding of concepts. Consequently, the aim of the present study is to investigate and compare the impact of interactive and non-interactive multimedia education on citizenship skills and social intelligence among students.

Materials and Methods

This research is a semi-experimental type in the form of a pre-test-post-test design with a control group. The statistical population of this research is the sixth grade male students of Shiraz city (6845 people) and through accessible sampling, 60 people in two groups of 30 people (experimental group and control group) were selected. The pre-test was administered in each group, followed by the experimental group undergoing eight sessions of multimedia instruction (including interactive and non-interactive CDs with video and audio, moving and still color images, speech, writing, and music) on the concepts of citizenship behaviors and social intelligence. Afterwards, a post-test was administered to both groups. The data collection tools in this study consisted of a citizenship skills questionnaire and the Tromso Social Intelligence Scale (TSIS). Inclusion criteria for the study included the students' motivation to attend meetings regularly. Conversely, exclusion criteria consisted of not attending more than two consecutive meetings, requesting non-cooperation, and lack of motivation to engage in activities. In terms of ethical considerations, participants were assured that the questions were solely for research purposes and that there was no need to provide names or surnames. Furthermore, participation in

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the research was voluntary, and participants were free to leave the training sessions at any time. The validity of the questionnaires was confirmed by experts and professors in the field of research, and their reliability was assessed using Cronbach's alpha method (Tables 1 and 2). The data were analyzed using univariate and multivariate covariance analysis with the assistance of SPSS version 22 statistical software.

Table 1. Cronbach's alpha value for citizenship skills questionnaire

Components	N of Items	Cronbach Alpha
Compliance with the law	3	0.86
self-awareness	4	0.82
Self Confidence	3	0.73
Decision making	4	0.77
Existence of order	4	0.81
Responsibility	4	0.83
To respect	3	0.79
Emotion control	3	0.73
Resolve conflicts	4	0.71
Acceptance of others	3	0.83
Ability to participate	2	0.84
Environmental Protection	3	0.78

Table 2. Cronbach's alpha value for Tromso social intelligence scale

Components	N of Items	Cronbach Alpha
Social Information Processing (SIP)	8	0.73
Social Awareness (SA)	7	0.66
Social Skills (SS)	6	0.64
Total	21	0.81

Results

First, we will discuss the descriptive findings that included the mean and standard deviation of the variables of citizenship skills and social intelligence in the experimental and control groups, separately from the pre-test and post-test stages:

Table 3. Mean and standard deviation of two groups of social intelligence variable and its components in pre-test and post-test

Variable	Group	Experimental		Control	
	Phase	Pretest	Posttest	Pretest	Posttest
Social Information Processing	Mean	22.90	26.87	22.77	23.27
	SD	4.32	4.19	3.77	3.16
Social Awareness	Mean	22.10	24.27	22.23	22.37
	SD	4.60	3.82	4.34	4.02
Social Skills	Mean	18.47	19.80	18.77	19.47
	SD	2.49	1.83	2.53	2.08
Total	Mean	63.47	70.93	63.77	65.10
	SD	5.26	4.39	4.70	4.29

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According to Table 3, it can be seen that in the pre-test stage, the average social intelligence of the experimental group was 63.47 and after the training, it increased to an average of 70.93. But in the control group, the average in the pre-test stage was 63.77, which decreased to 65.10 in the post-test stage.

Table 4. Mean and standard deviation of two variable groups of citizenship skills in pre-test and post-test

Components	Group	Experimental		Control	
	Phase	Pretest	Posttest	Pretest	Posttest
Compliance with the law	Mean	8.93	9.83	9.37	9.80
	SD	1.80	1.53	1.67	1.32
Self-awareness	Mean	14.77	15.73	14.47	14.49
	SD	2.40	1.98	2.79	3.31
Self Confidence	Mean	8.93	10.33	9.13	9.40
	SD	2.39	1.65	2.50	1.85
Decision making	Mean	10.73	12.30	11.30	11.60
	SD	3.86	3.20	2.98	2.41
Existence of order	Mean	15.90	17.43	15.07	15.37
	SD	3.02	1.96	3.05	2.70
Responsibility	Mean	16.20	17.93	15.97	16.27
	SD	2.59	1.50	2.92	2.54
To respect	Mean	10.67	10.90	10.30	10.35
	SD	2.17	2.22	2.23	2.27
Emotion control	Mean	10	12.10	10.57	10.83
	SD	2.94	1.81	2.70	1.89
Resolve conflicts	Mean	11.67	14.07	11.17	11.27
	SD	2.95	2.35	2.10	1.68
Acceptance of others	Mean	9.93	11.70	10.50	10.80
	SD	2.30	1.70	1.89	1.54
Ability to participate	Mean	7.87	9	8.13	8.27
	SD	1.46	0.91	1.73	1.20
Environmental Protection	Mean	9.20	11.37	9.23	9.40
	SD	2.80	1.97	2.42	1.98
Total	Mean	134.80	152.70	135.20	137.77
	SD	18.34	11.58	14.53	11.43

According to Table 4, it can be seen that in the pre-test stage, the average score of citizenship skills of the experimental group was 134.80 and after the training, it increased to an average of 152.70. But in the control group, the average in the pre-test stage was 135.20, which increased to 137.77 in the post-test stage.

In order to investigate the first hypothesis: (Interactive and non-interactive multimedia education has a significant effect on students' social intelligence.) Univariate covariance analysis was used. The results are presented in tables 5 to 8.

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Table 5. Levine's test to determine the equality of variances of social intelligence

Variable	F	DF1	DF2	p
Social intelligence	1.77	1	58	0.12

Table 5 shows that Levin's test is not significant after the social intelligence test, due to the lack of significance, the variances are equal. This is important because it confirms the reliability of the next results.

Table 6. Analysis of covariance test to investigate the impact of multimedia education on students' social intelligence

Source	SS	DF	MS	F	P	Effect size
Pretest	365.44	1	365.44	28.57	0.001	0.33
Group	536.66	1	536.66	41.95	0.001	0.42
Error	729.13	57	12.79			
Total	279181	60				

According to Table 6, the results of the post-test of social intelligence were significant according to the type of group (F=41.95, df=1, P 0.001). In this way, the experimental group increased more than the control group. The effect of the intervention of the independent variable (multimedia training) was 0.42, that is, 42% of the variance of the post-test scores of the social intelligence variable was due to the effect of this training. This means that multimedia education has had a positive effect on improving social intelligence.

In order to investigate the second hypothesis: (interactive and non-interactive multimedia education has a significant effect on students' citizenship skills), univariate covariance analysis was used.

Table 7. Levine's test to determine the equality of variances of citizenship skills

Variable	F	DF1	DF2	p
Citizenship skills	1.16	1	58	0.29

Table 7 shows that Levin's test is not significant in the citizenship skills post-test, due to the lack of significance, the variances are equal. This is important because it confirms the reliability of the next results.

Table 8. Analysis of covariance test to investigate the impact of multimedia education on students' citizenship skills

Source	SS	DF	MS	F	P	Effect size
Pretest	6599.28	1	6599.28	348.17	0.001	0.86
Group	3461.08	1	3461.08	182.60	0.001	0.76
Error	1080.39	57	18.95			
Total	1276588	60				

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According to Table 8, the results of the post-test of citizenship skills were significant according to the type of group (F=182.60, DF =1, P 0.001). In this way, the experimental group increased more than the control group. The effect of the intervention of the independent variable (multimedia training) was 0.76, that is, 76% of the variance of the post-test scores of the citizenship skills variable was due to the effect of this training. This means that multimedia education has had a positive effect on improving citizenship skills.

Discussion

Social intelligence and citizenship skills are crucial factors that require special attention when it comes to students in educational institutions. This is because by focusing on these two variables, we can have higher expectations from society as a whole. In this particular study, the aim was to assess the impact of interactive multimedia education and non-interaction on social intelligence and citizenship skills, while emphasizing their importance and place in students' lives.

The results of the covariance test for the first hypothesis, which compared interactive multimedia teaching to non-interactive multimedia teaching and its effect on students' social intelligence, revealed a significant difference between the experimental and control groups. These findings indicate that when comparing the effects of interactive and non-interactive multimedia training on the social intelligence of the experimental and control groups, the average social intelligence of the experimental group (interactive multimedia) was higher than that of the control group (non-interactive multimedia). The obtained level of significance demonstrates the significance of this difference.

Similarly, the results of the second hypothesis, which focused on the impact of interactive multimedia teaching on students' citizenship skills compared to non-interactive multimedia teaching, showed a significant difference between the experimental and control groups. This suggests that there is a significant difference between the post-test mean of the control and experimental groups in terms of citizenship skills. In summary, this research highlights the importance of social intelligence and citizenship skills in students, and demonstrates the positive impact of interactive multimedia education on these variables.

The findings of the covariance test also indicate that when comparing the effects of interactive and non-interactive multimedia training on citizenship skills in experimental and control groups, the

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average citizenship skills in the experimental group (interactive multimedia) surpass those in the control group (non-interactive multimedia). Based on the obtained level of significance, it can be concluded that this difference is indeed significant. Consequently, it can be inferred that interactive multimedia training has a more substantial impact on citizenship skills in the statistical sample, as compared to non-interactive multimedia training.

Given the significance and influence of media (both interactive and non-interactive) on citizenship skills, the second hypothesis of this study demonstrates that media and multimedia (both interactive and non-interactive) have a positive influence on citizenship skills. These results align with the findings of ShahMohammadi and Hashemipour (2014), who also revealed the positive and significant impact of television as an influential medium on citizenship skills within the statistical sample, particularly in the context of television educational programs. As indicated, this study supports the notion that multimedia education (both interactive and non-interactive) has a positive and significant effect on students' social skills and social intelligence.

Although previous studies on interactive and non-interactive multimedia education have primarily focused on variables such as learning, memorization, and academic progress (Ahmadi & Fallah, 2018; Zaraii Zavaraki & Gharibi, 2012), few studies have examined the influence of multimedia on social intelligence and citizenship skills. As demonstrated, the comparison between the two teaching methods reveals that interactive multimedia training has a greater impact on both variables. Despite the lack of specific comparisons between interactive and non-interactive multimedia regarding social intelligence and citizenship skills, some past studies have compared the two in relation to other variables such as learning (Ahmadi & Fallah, 2018). These studies have consistently shown that interactive multimedia education has a more pronounced effect on learning, academic progress, memorization, and so on, compared to non-interactive multimedia. Furthermore, Rahmani Neishabour et al. (2007) have compared functional and non-interactive multimedia training in terms of self-regulation and found that interactive multimedia training has a greater effect on this variable. Overall, the results of this study underscore the positive and significant impact of both interactive and non-interactive multimedia education on students' citizenship skills and social intelligence. However, when comparing interactive and non-interactive multimedia education, it becomes evident that interactive multimedia education has a

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more significant effect on students' social intelligence and citizenship skills than non-interactive multimedia education.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Payam e Noor University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis and contributed to the article and approved the submitted version.

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