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The Effect of An Educational Module According To 21st-Century Skills on The Academic Achievement of Students of Schools in Oman

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Abstract

This paper aims to lay the groundwork for ongoing discussions about how 21st-century skills may be effectively incorporated into the education module. In the past, most of the studies dealt with 21st-century skills as a dependent variable, and the current article dealt with 21st-century skills as an independent variable and how to integrate them into the school curricula. Moreover, the current article targets a more specific educational stage: the twelfth-grade students who transition from formal education to higher education institutions or engage in the labor market. The study sample consisted of two groups of 39 students each, one experimental and one control. The two groups were chosen were Abu Tammam School for Basic Education for Boys Grades (11-12), and Sheikh Salem bin Saeed Al-Sayeghy School for Basic Education for Boys, grades (10-12) selected outside the study sample and within the study community. The study's findings showed that educational module according to 21st century skills had a positive impact on academic achievement of the students of twelfth grade, first semester students who are enrolled in the economics and commerce field.

Keywords: Education, Curriculum, and Teaching Methods, 21st-Century skills, Oman, T-test, Academic Achievement

Introduction

The dominance of digital technology characterizes the society of twenty-first-century digital technology (Laurillard, 2008). Our current technological advancements have created a digital culture that is constantly changing. The students require adaptable, innovative individuals

who can constantly change themselves and actively participate in their continuous learning. (Binkley et al., 2012)

Oman's linguistic, ethnic, and religious diversity made it challenging to preserve tradition, culture, and language while advancing its educational mission in the face of a rapidly changing global environment (Nasser, 2019). Oman's national policy aimed to build a contemporary civilization capable of interacting with technical advancements in a developed and technologically driven world (Ahmed & Al-Roubaie, 2012; Al-Rahbi, 2008). The scientific method of learning and teaching has also been emphasized by the Ministry of Education in order to advance society, foster innovation, and allow it to replicate itself scientifically (Nasser, 2019). Instilling intellectual abilities and knowledge acquisition of life skills for citizenship and lifelong learning was therefore considered education's perpetual mission. These tactics aimed to develop a well-rounded Omani personality capable of handling present and future issues and participating in the creation of significant, objective, and scientific methods to cope with the contemporary and technological age.

The 21st-century skills have also been emphasized by the Ministry of Education in order to advance society, foster innovation, and allow it to replicate itself scientifically (Al Khatri, 2019). Instilling intellectual abilities and knowledge acquisition of life skills for twelfth-grade students was therefore considered education's perpetual mission. These tactics aimed to develop a well-rounded Omani personality capable of handling present and future issues and participating in the creation of significant, objective, and scientific methods for technological contemporary and 21st-century technology age (Al Sheyadi, 2017).

The Skills are based on knowledge. Due to knowledge's dynamic and evolutionary nature, it is difficult for students to be aware of the ongoing production and citation of new information due to prior learning experiences. (Hasan et al., 2018). The educational module is blended with new material and encourages the in-depth study of new ideas and facts. Skills instruct students on thinking creatively, solving challenging issues, and communicating well in a classroom. The term "21st-century skills" refers to the information, talents, and traits required for students to thrive in the modern world, particularly when they move from high school to college, the workforce, and adulthood. (Soulé & Warrick, 2015). Achievement for students in high school is essential to succeed in real-world situations. The World Health Organization (WHO) defines important life skills as decision-making and problem-solving, creative and critical thinking, communication and interpersonal skills, self-awareness and empathy, and stress management. The WHO places a high value on general psychosocial qualities, which may be cultivated over time with purposeful effort.

Literature Review

The educational system was conventional, the courses were rather broad, and the emphasis was on the curriculum rather than the students—lack of a distinct vision and mission in schools and the ministry (Care et al., 2018; Henriksen et al., 2018; Nasser, 2019). Books were out-of-date, and the rigorous curriculum and testing dominated the educational process. An important document that offered a framework for developing the Omani economy was Vision 2020 of Oman (Vogel, 2020). The text also served as a blueprint for the nation's educational system. Vision 2020 aimed to become a "Newly Industrialized Economy," reducing the gaps between Oman and the oil-rich nations in its neighborhood. In order to reduce dependence on its meager oil reserves, Oman tried to lay a strong foundation for human resource development in its 2020 vision plan (Al Hasani & Husin, 2021). The blueprint document aimed

to advance Oman's human resource, social, and economic development as well as the country's educational strategy (Al-Beloohi & Al-Maamari, 2020).

In Oman, twelfth-grade students may choose to focus on the sciences or the arts over the next three years of secondary school, provided that their primary school grades attest to their proficiency in both fields. Around 77% of gross ratio students are enrolled in secondary education. The ratio is the total enrollment of students, regardless of age, to the people in the age group judged to correspond to the formally displayed education level. Secondary education attempts to lay the basis for lifelong learning and human development by providing more subject- or skill-specific instruction from more skilled teachers. Secondary education completes the basic education delivery that started in elementary school (WB, 2022)

One of the primary pillars was strengthened by the curriculum's enhancement according to the 21st century, which concentrated on two essential areas. The curriculum's content comes first, followed by instructional strategies. In terms of curriculum and subject matter, an effort was made to cut down on the theoretical components and link the content to students' daily life and the outside world. Additionally, each educational phase's curriculum had to be adjusted by teachers to fit the students' capacities to achieve the academic achievement of the twelfth-grade students (Saptono et al., 2020). The educational module aims to reduce their reliance on rote learning and memorization and move forward with constructivist approaches with a focus on problem-solving, critical thinking skills, and cooperative work according to 21st-century skills (Novalinda et al., 2020).

There are two student achievement gaps in the US. The nationwide goal of the United States over the past ten years has been to narrow the achievement gap between the most minor and most accomplished students and between the most and least wealthy. (Hanushek et al., 2019) (Partnership for 21st Century Skills), Countries that do well on PISA, a test that assesses 21st-century abilities such as critical thinking and problem solving, have had faster GDP growth than countries that do not. Academic accomplishment standards declared by academics and student desire for student satisfaction with the learning process (Pearman et al., 2019)

Methodology

Research Design

Pre-post test design using a quasi-experimental technique with a non-equivalent control group. There were two groups based on the design of the two groups (experimental and control) to know the effect of the independent variable 21st-century skills, on the development of the dependent variable academic achievement.

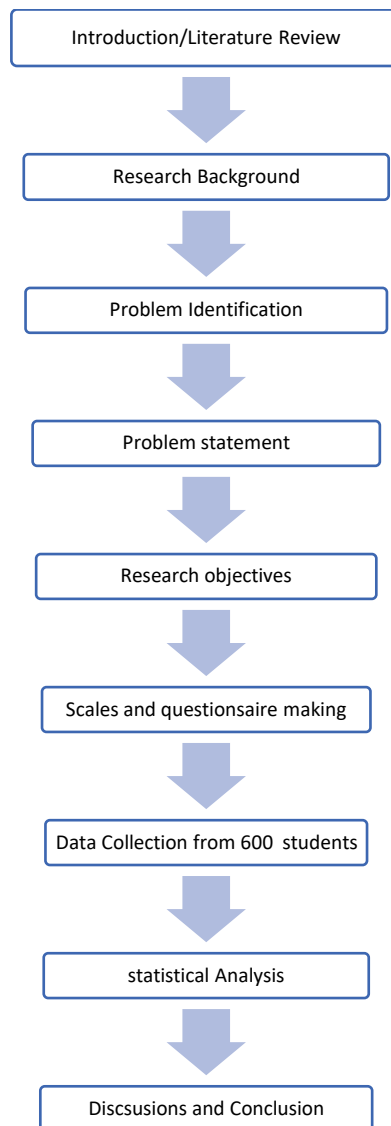


Figure 1 Research Design

The above figure 1 shows the research design of the study. This research design included nine steps. All these steps are discussed in detail in this present research.

Variables

There is one dependent variable in this present study, and that is academic achievement.

Subjects of Study

The study includes all twelfth-grade students from

Research Question of the Study

Is there a significant effect of an educational module according to 21st-century skills on the academic achievement of twelfth-grade students in Oman?

Is there a significant difference in variance of academic achievement between the two groups?

The Hypothesis of the Study

1. Is there a positive association between the mean score of both groups of an educational module according to 21st-century skills on the academic achievement of the twelfth-grade students in Oman?
2. Is there a negative association between the mean score of both groups of an educational module according to 21st-century skills on the academic achievement of the twelfth-grade students in Oman?
3. There is no association between the mean score of both the group of an educational module according to 21st-century skills on the academic achievement of the twelfth-grade students in Oman.

Significance of the Study

In the past, most of the studies dealt with the skills of the 21st-century skills as a dependent variable, and the current study dealt with the skills of the 21st-century skills as an independent variable and how to integrate them into the school curricula. Moreover, the current study targets a more specific educational stage, namely the twelfth-grade students who transition from formal education to higher education institutions or engage in the labor market. If the study's findings support the experimental group compared to a controlled group, then the importance of an educational module according to 21st-century skills on the academic achievement of students of the school of Oman is more critical.

It may also encourage other high schools in the Sultanate of Oman to consider trying and executing this evaluation experiment connected to twelfth-grade students' academic progress. It might assist them in deciding on an appropriate school programme for 21st-century skills. Furthermore, there is a paucity of study evaluating the influence of pupils' academic accomplishment at an Omani school.

The Study Population

The population of the study is based on the study problem and its objectives; the study community represents all twelfth-grade students who study the subject (applications in economics and commerce) in schools affiliated with the General Directorate. for education in Muscat Governorate in the academic year 2021/2022 AD

The Study Sample

The study sample represents one of the original community schools, including the twelfth grade. It was chosen intentionally according to the willingness to cooperate in applying the study procedures. Affiliated to the Directorate General of Education in the Governorate of Muscat, a number commensurate with the nature of the study design in the semi-experimental curriculum.

The educational unit prescribed according to the skills of the twenty-first century was studied, and the other was the control group, which numbered (39) students who studied in the usual way after verifying the equivalence of the two groups before the start of the experiment using statistical control methods in academic achievement

Design and Procedure

This present study used a quasi-experimental technique to know the effect of educational module 21st-century skills on twelfth-grade students in schools. The 39 participants each were taken in this present study as the experimental group and control group. The students

were taught by one of the researchers that the experiment was going to conduct in order to measure their academic achievement. The researcher also applied the academic achievement scale (the tool of the current study) prior to the students of the two groups one day before the start of the experiment, specifically on 20/7/2022 AD, in order to ensure the equality of the experimental and control groups in academic achievement, as he extracted the responses of the sample students on a scale academic achievement which are shown in the result section.

Instrument of the Study

The study aims to examine the effect of an educational module according to 21st-century skills on the academic achievement of twelfth-grade students of schools in Oman who studied economics and commerce. The researchers experimented before and after the experiment as an instrument to achieve the purpose of the study. The researchers made the necessary changes in the experiment to know the effect of an educational module according to 21st-century skills on the academic achievement of twelfth-grade students of schools in Oman to fit the purpose of the study.

Validity of the Scale

The validity of the scale's internal consistency: where the data was entered into the SPSS statistical package program, and the data was analyzed by calculating the correlation coefficients (Pearson) between the degree of each item and the total degree of the dimension to which the item belongs. to which a function belongs statistically. Calculating the correlation coefficients between the score of the item and the total score of the dimension to which the item belongs and between the score of each dimension and the total score of the scale.

Reliability of Instrument

The data were entered into the SPSS Statistical Package Program. The data were analyzed by calculating the stability coefficient (alpha Cronbach) for each dimension of the scale, and for the scale as a whole. It became clear that all the values of the stability coefficients for each dimension of the scale, and for the scale as a whole are appropriate to indicate stability.

Data Collection

The main data were collected before applying the experiment to measure the equivalence between the experimental and control groups in academic achievement and after applying the experiment to measure the impact of the experiment on the development of academic achievement by conducting study tools with the study sample of twelfth-grade students at Abu Tammam School for Basic Education for Boys Grades (11-12), in addition to collecting secondary data from the previous school administration related to measuring equivalence between the experimental and control groups in academic achievement before applying the experiment by extracting the results of the study sample students in the first semester.

Other secondary data related to the statistical accuracy of the study tools were also collected by extracting the results of students of one of the academic divisions in the twelfth grade at Sheikh Salem bin Saeed Al-Sayeghy School for Basic Education for Boys, grades (10-12) outside the study sample and within the study community. The number of the study population from the Department of Statistics and Information at the Ministry of Education.

Statistical Processing of Data

To extract the results and statistical data, the researcher used the SPSS program in order to calculate correlation coefficients (Pearson) to measure the effectiveness of the items of the academic achievement scale and calculate the validity of coefficients (Cronbach's alpha) to measure the effectiveness of the items of the scale and the achievement test items, before applying them to the study sample. Furthermore, the T-test was to compare the mean scores of the students of the experimental and control groups before applying the experiment, through which the arithmetic means, standard deviations, and the value of "T" was calculated for the scores of the students of the experimental and control groups in academic achievement. Additionally, it compares the mean scores of the students of the experimental and control groups after applying the experiment, through which the arithmetic averages were calculated, and the standard deviations and the value of "T" for the scores of the students of the experimental and control groups in academic achievement.

Results

The results of the "T" test for the comparison between the mean scores of the students of the experimental and control groups in the responses of the sample students on the (tribal) academic achievement scale.

Table 1

Results of pre t-test(paired) for academic achievement of students

Group	N	Mean	SD	St Err	DF	T-Value
Experimental	39	48.01	26.59	4.11	76	-0.192
Control	39	48.23	25.45	4.07		

It is clear from Table (1) that the calculated value of "t" is statistically insignificant at the level of significance ($\alpha \leq (0.05)$), which indicates that there is a statistically significant difference between the average responses of the students of the experimental and control groups, which indicates the equivalence of the two groups in academic achievement before applying the experiment.

Table 2

Results of independent sample t-test for academic achievement of student's post-test

Group	N	M	SD	t	Sig.(2-tailed)
Control	39	18.21	10.91	-8.40	0.000
Experiment	39	36.14	12.71		

Note: p-value <0.05

An Independent t-test showed the effect of digital skills of the 21st century on the academic achievement of twelfth-grade students. Table 2 presents the descriptive statistics and outcomes of the independent-samples t-test for students' academic success post-test. The findings revealed a statistically significant difference in post-test scores for the trial. (M = 18.21, SD = 10.91) and the control groups (M = 36.14, SD = 12.71); $t = -8.40$, $p < 0.000$. Descriptive statistics showed that students who learned 21st-century skills achieved higher results than the control groups who were unaware or not efficient in 21st-century skills.

Hence, this study has been shown to help students achieve better school results and achievement.

21st-Century skills

A multiple analysis of variance was carried out to look at the variability in a group's performance in 21st-century skills at two separate periods (pre and post-intervention). The information was whole. The basic hypotheses of linearity, multi-collinearity, homogeneous variance and co-variance matrices, univariate and multivariate outliers, and normality tests were all held. Academic achievement is connected to the interaction between two group. Table 3 Figure 1 shows the evolution of each intervention group's academic achievement ratings over time.

Table 3

Univariate test results for each domain of 21st-century skills

Effect	Domains	SS	df	MS	F	Sig.	Partial η^2
Time*Group	21 st Digital skill literacy	0.191	1	0.191	2.495	0.115	0.010
	Critical thinking	0.034	1	0.032	0.340	0.560	0.002
	communication	0.285	1	0.257	2.244	0.134	0.015
	Productivity and achievement	0.564	1	0.584	5.375	0.021	0.037
	Empathy	0.042	1	0.041	0.174	0.673	0.002

Table 4

Results of independent-samples t-test for academic achievement

Time	Group	N	M	SD	t	Sig. (2-tailed)
Pre	Control	39	3.61	0.37	0.728	0.435
	Experiment	39	3.54	0.32		
Post	Control	39	3.62	0.35	-2.256	0.022
	Experiment	39	3.76	0.34		

$\alpha = 0.05$

There were no significant differences between groups at the pre-test [$t = 0.728$, $p = 0.435$]. However, there was a significant difference between two groups at the post-test [$t = -2.256$, $p = 0.022$], as shown in Table 5 of additional observational analysis of the interaction between two group for academic achievement scores. The experiment group reported higher levels of academic achievement ($M = 3.73$, $SD = 0.34$), the control group ($M = 3.62$, $SD = 0.35$), according to an analysis of the post-test mean scores.

Table 5

Results of paired-samples t-test for academic achievement

Group	Test	N	M	SD	t	Sig. (2-tailed)
Control	Pre	39	3.60	0.38	-0.680	0.499
	Post	39	3.63	0.36		
Experiment	Pre	39	3.55	0.33	-3.945	0.000
	Post	39	3.77	0.36		

 $\alpha = 0.05$

As shown in Table 6, additional research also revealed a substantial improvement in the academic success levels for the therapy group between the pre-test and post-test ($t = -3.945$, $p = 0.001$). These results demonstrated that pupils who employed 21st-century talents outperformed the control groups in terms of academic accomplishment. The control groups lacked the necessary abilities to succeed in school.

Discussion

Our findings suggested that learning through integrating 21st-century skills in the education module was more effective in students' academic achievement (Osman & Lay, 2022; Özcan & Koca, 2019; Rashid & Lim, 2020). Also, skills support in a higher academic achievement in the 21st-century skills level too. In particular, this study's results help students develop 21st-century skills (Woldeab & Brothen, 2019). In the past, studies engaging in idea exchange, reasoning, and argument from evidence may help students become more aware of competing viewpoints and develop a thorough understanding of 21st-century knowledge and skills (Care et al., 2018; Sumardi et al., 2020). The primary problem Oman faced was the necessity to stay up with technological advancements of the twenty-first century (Saleh, 2020) and the new educational approaches necessary to educate Omani students in the twelfth grade for challenges that the current modern global environment will bring about (Tuzlukova & Singh, 2019). Oman believed in improving in crucial subjects to apply such knowledge and abilities to skills development. Oman was charged with a desire for change and a high degree of flexibility. The development of new and revised educational curricula as well as digital skill learning methodologies in schools is intended to aid young Omanis in their acquisition of knowledge, skills, and attitudes, they may need to study and grow in order to adjust to the very altered future that awaits them. (Nasser, 2019)

The curriculum will include new teaching tactics, tangible objects, and better student assessment and evaluation methods. Physical, intellectual, social, and personality traits were all part of the integrated development that underpinned the framework and pillars of the educational reform movement. As a result, the ideology strongly emphasized the collective formation that is in tune with and consistent with individual requirements. (Alam, 2022)

The respondents in the experimental group made efficient progress relative to the respondents of the control group, as seen by comparing the achievement of students in both groups before and after the experiment. The researchers discovered that low achiever's students had a substantially greater rise in their skills when comparing the skills of high achiever's students and low achievers in the same group—the experimental group. The use of the approach of student self-assessment may therefore be more advantageous to low achievers, albeit high achievers may also gain from it (Yan et al., 2020).

Limitations of the Study

The limitation of the study is that there are only first-semester twelfth-grade students of Abu Tammam School for Basic Education for Boys Grades and Sheikh Salem bin Saeed Al-Sayeghy School for Basic Education for Boys, grades (10-12) who studied economics and commerce. Researchers should conduct further studies to investigate the unknown and hidden things among the different educational level backgrounds of students

Conclusion

Developing 21st-century skills is necessary to ensure students are ready for future academic achievement. This study was conducted to establish conceptual understanding and the importance of 21st-century skills in students' academic achievement. The experiment was explained to the students so they may investigate the abilities and information required for academic success. In conclusion, the present study can create a learning environment for the students that enables students to master their skills and knowledge and practice various 21st-century skills in real world. This will increase student academic achievement and success in real world who have a strong knowledge and skills of 21st-century. This study showed that their ability to work and communicate effectively in groups to generate innovations. Results of this study prove that 21st century skills have the ability to improve twelfth grade students' of economic and commerce academic achievement.

List of Abbreviation

21st century skill Twenty-one-century skills

An educational module: an educational unit scheduled for the twelfth-grade students for the second semester of the Ministry of Education in Oman for the academic year 2021/2022 AD

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Data availability Statement

Not required

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