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Competencies of Using Computers in Teaching: An Evaluative Study on Students of the Faculty of Education, Sohag University

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Abstract

This study aimed to assess the competencies of Sohag University's Faculty of Education students in computer-based teaching competencies, employing a descriptive-analytical approach and a questionnaire covering eight core areas: the role of computers in education, information technology skills, integration of computers in teaching, use of the internet and email for instruction, operation of Windows OS, utilization of presentation software, spreadsheets, and word processing tools. A cognitive achievement test was also developed to measure students' knowledge in these areas, with a sample comprising 235 students from both scientific and literary disciplines. The findings revealed varied student perceptions regarding the impact of their academic studies on developing computer-based teaching skills, with statistically significant differences ($p \leq 0.01$) favoring scientific students over literary students in both their questionnaire responses and test performance. Additionally, students generally exhibited low competency scores on the test, highlighting the need for enhanced focus on practical skill development. A positive correlation ($r = 0.26$) was also identified between literary students' questionnaire responses and their test performance, statistically significant at the 0.01 level, underscoring the importance of bridging the gap between theoretical knowledge and practical application.

Keywords: *Computer-Based Teaching Competencies, Integration of Technology in Education, Student Perceptions, Practical Skill Development.*

Introduction

Educational institutions at all levels, both secondary and higher, face current and future challenges due to the rapid advancements in information technology and the growing role of computers. Societies are transitioning toward becoming increasingly computerized, where computers play a key role in everyday management. This shift has left many educators feeling unprepared to meet the demands of technological advancement, creating a gap between modern communication technologies and their integration into educational practices (Annandan & Kelly, 1982). Consequently, the roles and responsibilities of teachers have evolved, necessitating new competencies and skills to keep pace with these developments (Pagrow, 1983; Benson, 1984; Spuck & Atkinson, 1985).

The widespread use of computers in education has prompted the development of computer labs and curricula. However, the focus has expanded beyond simply teaching computer courses to integrating technology across various scientific disciplines. In response to the growing presence of computers in public education, institutions have introduced specialized programs for training computer teachers. Despite this, less attention has been given to preparing teachers in other subjects to effectively use computers in teaching.

Several advanced countries have taken significant steps to incorporate technology into education, aiming to revolutionize the learning experience across scientific fields. The International Society for Technology in Education (ISTE, 2000) identified 13 essential competencies for teachers in technology-equipped classrooms. Key competencies include: (1) the ability to operate computer systems efficiently, (2) the use of online networks to support learning, and (3) demonstrating knowledge through multimedia tools to enhance teaching.

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Andrew (1996) emphasized the need to define the computer-related competencies required by educators, including evaluating the appropriateness of software tools based on students' skills. The goal is to help teachers use computers effectively, identify their needs, and integrate technology into diverse learning environments. Similarly, the 1999 conference at the Arab League headquarters in Cairo highlighted the importance of defining teachers' professional competencies and revising instructional strategies to ensure a stronger connection between students' cognitive development and educational content.

The Kingdom of Saudi Arabia has made significant progress in integrating technology into education, exemplified by the "Prince Abdullah Bin Abdulaziz and His Sons' Student Computer Project," which equips students with essential technology skills to prepare them for future challenges (Al-Mohaya, 2002).

In light of these developments, it is crucial to prepare teachers with strong computer literacy skills. Well-trained educators remain essential to the successful adoption of technology in schools. Therefore, teacher preparation programs play a critical role in equipping teachers to effectively utilize computer-based educational tools (David, 1989; Saleh & AlAli, 2024).

Study Problem and Questions

Research indicates that integrating computers into education has introduced new pedagogical approaches requiring specialized teacher skills. Furthermore, the evolving technological needs of teachers have prompted significant changes in teacher preparation programs (Oliver, 1994; Ali & Saleh, 2023). In England, the Council for the Accreditation of Teacher Education (CATE) mandated information technology courses as a prerequisite for teacher certification, prompting teacher preparation institutions to incorporate these subjects into both undergraduate and postgraduate programs (Hodgkinson & Philwild, 1994).

However, despite these advancements, some challenges persist. Naabi (2010) pointed out a gap in teacher training programs, where computer-related courses are often isolated from other components and taught with a technical focus rather than an educational one. Instructors responsible for curriculum and teaching methods often lack the skills to integrate technology into their courses. Additionally, student teachers may not apply these technologies during their field practice due to limited exposure during training and insufficient resources in schools (Saleh et al., 2023; AlAli, Wardat, Saleh, & Alshraifin, 2024).

This highlights the need for education faculties, such as the Faculty of Education at Sohag University, to play a vital role in re-engineering teacher preparation. A well-prepared teacher must be equipped with the modern competencies needed to utilize technology effectively in classrooms. As Zain El-Din (2007) and others noted, teachers tend to teach the way they were taught, raising the question: How can teachers innovate if they are still trained with outdated methods (Saleh & AlAli, 2024; Alwaely et al., 2023)?

The study aims to address the following main question:

To what extent do students at the Faculty of Education, Sohag University, possess the competencies required for computer-based teaching?

The study further explores these sub-questions

- What are the essential competencies for using computers in teaching?
- To what extent do students at the Faculty of Education, Sohag University, possess these competencies?
- Do students' Competencies levels in computer-based teaching vary between scientific and literary majors?

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Study Objectives

- To identify the essential competencies teachers need to integrate computers as a modern educational tool in teaching.

- To assess the availability of these competencies among students in the General Diploma at the Faculty of Education, Sohag University.

Significance of the Study

The study's significance lies in the following:

- It responds to the growing academic demand for improving education through a precise identification of the skills required for effective computer use, helping to develop teachers and learners capable of innovation and adaptation to technological advancements.

- It aligns with ongoing educational reform initiatives by ministries of education across the Arab world, especially in Egypt.

- It offers supervisors of practical training a competency framework to guide their evaluation of teachers' professional performance in technology-based teaching.

Previous Studies

The previous studies highlight the importance of technical competencies in education and the need to enhance teachers' computer skills through targeted training. Below is an overview of the most relevant studies:

- *Bruwelheide (1992):* Identified essential competencies for using computers in teaching, including instructional design, preparation of computer-based educational materials, programming, organizing hardware and software, and integrating computer literacy in education and society.

- *Mims (1994):* Focused on the computer skills required for school administrators, emphasizing the importance of educational computing over administrative computing, and recommended excluding administrative programming from essential skills.

- *Hudson (1994):* Used the Delphi method to identify 51 essential competencies for integrating computers in agricultural education and stressed their importance in teacher preparation programs.

- *Montagu & King (1995*)**:** Compared the perspectives of school administrators and computer experts regarding necessary computer skills, highlighting the importance of understanding tasks that can be accomplished with computers in both education and administration.

- *Bennett (1997):* Pointed out that teachers' lack of technical knowledge hinders the effective use of computers, alongside challenges in troubleshooting technical issues.

- *Wang & Holthaus (1997):* Found that 85% of student-teachers use computers, with training and practice being more common than simulations and tutoring programs.

- *Pamela (2000):* Highlighted gaps in teacher training programs concerning educational technologies, calling for the inclusion of computer skills in teacher preparation.

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- Al-Muhaisin (2000): Revealed weaknesses in computer services provided to faculty members at Saudi education colleges, despite positive attitudes toward using computers, albeit with limited training.

- *Abdel Khaleq (2022):* Showed that secondary school teachers in Oman possess technical competencies to a great extent, but their application remains limited, with differences favoring female teachers.

- *Quesada et al. (2001):* Confirmed that online professional development programs improved teacher performance and fostered collaborative learning communities without time or place constraints.

- *Morale (2001):* Found that teachers and students with personal computers at home used them more efficiently, with younger individuals showing greater motivation.

- *Al-Shammari et al. (2023):* Reported a disparity in mathematics teachers' competencies, with basic computer skills being strong, but computer applications in teaching at a moderate level.

- *Shute & Rahimi (2017):* Explored computer-based assessment for learning (CBAfL) in primary and secondary education, emphasizing its role in integrating skills assessment into the learning process.

- *Hoogland & Tout (2018):* Examined the role of technology in evaluating 21st-century mathematics education, discussing the various aspects of technology-based assessment.

- *Kurniawan et al. (2020):* Highlighted the importance of computer-based assessment in developing essential teaching competencies, noting that such assessments help prospective teachers better understand core teaching skills.

The studies collectively stress the importance of technical competencies for computer-based teaching and the need to integrate technology into curricula. They highlight several challenges, such as a lack of technical knowledge and limited access to modern equipment. The findings emphasize the necessity of continuous professional development programs to improve teachers' technical skills. Additionally, the studies reveal that the level of competency in using computers for teaching ranges from low to moderate, underscoring the importance of training programs to enhance teachers' performance and ensure the effective use of educational technology.

Study Literature

The concept of *competency* relates to performance, as tasks and criteria are defined for teachers to achieve mastery of educational competencies (Adas, 1996). Performance consists of observable, measurable behaviors based on acquired knowledge and skills to meet required standards (Arab League for Education, Culture, and Science, 1982). Competency elements include:

- *Cognitive Component:* Covers theoretical concepts and rules essential for mastery.

- *Practical Component***:** Involves observable skills (manual and verbal).

- *Affective Component:* Encompasses attitudes and values that foster professional commitment.

Competency-based programs play a crucial role in shaping the philosophy of teacher preparation, evaluating programs, identifying training needs, and addressing scientific and professional gaps (General Directorate of Educational Supervision, 2006; Bobryts'ka & Prots'ka, 2018).

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Characteristics of Competency-Based Teacher Preparation Programs

- Emphasis on practical training alongside theoretical knowledge.
- Provision of structured learning experiences aligned with teacher roles.
- Use of educational technologies like learning kits and micro-teaching.
- Application of advanced assessment strategies, such as feedback and formative evaluation.
- Competency identification through course content analysis, job task analysis, and expert consultations (Tarmo & Kimaro, 2021; Chappell et al., 2020; Wong-Ratcliff & Malave, 2020).

These programs ensure that teachers achieve specific competencies before graduation, enhancing both efficiency and effectiveness (Al-Fatlawi, 2003). They aim to:

Define required teacher competencies clearly.

Emphasize practical training over theoretical knowledge.

Set clear criteria for assessing teaching performance.

Enable teachers to integrate technological advancements (Saleh & AlAli, 2022; AlAli & Saleh, 2022).

Trends in Educational Literature and Computer Integration

Recent studies highlight efforts to integrate computer technology in education, emphasizing the need for teachers to possess a minimum level of competence. The **International Society for Technology in Education (ISTE)** has defined 13 competencies that should be included in teacher preparation programs:

- Operating computers effectively with diverse educational software.
- Utilizing networks to support teaching and evaluation.
- Applying instructional design principles and educational research findings.
- Evaluating computer-based instructional materials.
- Using computer applications for data management, communication, and decision-making.
- Designing learning activities aligned with modern technologies and student needs.
- Leveraging multimedia and email systems to enhance learning.
- Understanding the ethical, legal, and social implications of technology use.
- Identifying resources to maintain up-to-date knowledge of educational technologies.
- Employing technology tools for personal and professional development.
- Integrating technology into subject areas and assessing learning outcomes.
- Using technology to access information sources and improve productivity.

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- Facilitating the roles of teachers and learners through modern technologies.

ISTE also developed technology standards for teachers, students, and administrators, focusing on planning, teaching, assessment, productivity, and ethical issues. Each standard includes measurable indicators suitable for evaluation.

Teacher Competencies for Technology Integration

Bruwelheide (1992) identified core technology-related competencies, including:

- Instructional design.
- Development of computer-based materials.
- Programming and simulation.
- Managing software and hardware.
- Understanding the role of computers in education and society.

Ayersman et al. (1996) outlined essential skills for university students and faculty, such as creating word documents, using spreadsheets, and conducting online research. Yaghi (2005) added that both teachers and students should possess skills in computer operation, data processing, multimedia editing, and digital communication.

Competency-Based Educational Technology in Saudi Arabia

In Saudi Arabia, the **General Directorate of Educational Technology** proposed a list of required competencies for teacher graduates. Key competencies include:

- Understanding the concept and role of educational technology.
- Designing learning scenarios using educational technologies.
- Selecting appropriate technologies based on curriculum needs.
- Producing educational materials.
- Using technology to design individual learning units for talented students.
- Employing computers for document management and presentations.
- Utilizing networks for teaching and research.
- Promoting the integration of ICT in education.
- Providing equal access to learning resources for all students.
- Encouraging innovation in educational technology.

The educational literature emphasizes the need to integrate computers into teaching, requiring teachers to possess key competencies for effective technology use. Rapid technological developments necessitate aligning teacher preparation programs with educational needs. This alignment enhances teaching quality and ensures the effective use of technology in education.

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Methodology

This study adopts the **descriptive-analytical method** as it aligns with the nature of the research problem. This method focuses on describing the current reality by collecting, analyzing, and interpreting data to diagnose areas of deficiency and propose solutions based on the study's findings.

Study Sample

The study sample consisted of students enrolled in the General Educational Diploma at the Faculty of Education, Sohag University. The sample included both humanities majors—such as Arabic, English, Islamic Studies, and Social Studies—and science majors, namely Science and Mathematics. The total number of participants was **235 students**, with **200** from humanities majors and **35** from science majors.

The data shows that the number of humanities students (200) significantly exceeds that of science students (35). This discrepancy is attributed to the broader range of humanities disciplines and higher enrollment rates in these fields compared to the limited number of science disciplines and fewer students from science majors pursuing the General Educational Diploma.

Instruments

- *Questionnaire:* Designed to assess the current state of computer-based teaching competencies among students at the Faculty of Education, Sohag University.
- *Achievement Test*: Aimed at evaluating students' knowledge of the theoretical aspects of computer-based teaching competencies.
- *First: The Questionnaire*
- To achieve the study's objective, the researchers developed a list of essential educational competencies required for teaching with computers. The preparation and development of this list went through several stages, outlined as follows:
- *Stage One:* Reviewing a range of scientific sources to prepare and develop these competencies, including:
- Studies that focused on teaching competencies in general, such as those by (Tayef, 1999; Taima, 2006; Al-Hakami, 2004; Marai, 2003).
- Studies that focused on competencies in the field of educational technology, such as those by (Al-Faqawi, 2007; Al-Najjar, 1997; Yaghi, 2005; Washah, 2007; Bruwelheide, 1992; Ayersman, David & Others, 1996).
- Studies that addressed the use of computers in teaching various subjects, such as those by (Al-Manaei, 2000; Badawi, 2010; Cuban, 2001).
- Results of studies and recommendations from various global institutions and associations concerned with technology in education, such as the (International Society for Technology in Education; CATE - the council responsible for teacher preparation in England; Ministry of Education - General Administration of Educational Technology, 2003; Kingdom of Saudi Arabia - Ministry of Education - Educational Documentation, 2004; Kingdom of Saudi Arabia - Ministry of Education - Standards for Elements of the Educational Process, 2008).

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- *Stage Two:* The competencies identified from the previous sources were categorized into main categories, each containing several sub-competencies necessary for teachers to effectively use computers in teaching.

- *Stage Three:* A list of computer teaching competencies was established, and the validity and integrity of the list were verified by presenting it to a group of specialized reviewers in curricula, teaching methods, and educational technologies from education colleges. Feedback was gathered regarding the main categories of competencies, the alignment of each competency with its respective main category, and the linguistic accuracy of these competencies.

- *Stage Four:* After analyzing the reviewers' comments and making the necessary modifications, the final list of competencies included the following main categories:

- Competencies related to computers and their significance in education.

- Competencies related to information technology.

- Competencies related to the use of computers in teaching.

- Competencies related to the information network and email and their uses in teaching.

- Competencies related to operating and using the Microsoft Windows system in teaching.

- Competencies related to using Microsoft PowerPoint for teaching.

- Competencies related to using Microsoft Excel for teaching.

- Competencies related to using Microsoft Word for teaching.

Validity of the Questionnaire

The validity of the questionnaire was assessed using the Internal Consistency method, calculating the correlation coefficient of the dimensions with the total score and the items with the total score. The internal consistency coefficients for the dimensions were as follows: First Dimension: **0.794**, Second Dimension: **0.815**, Third Dimension: **0.861**, Fourth Dimension: **0.925**, Fifth Dimension: **0.879**, Sixth Dimension: **0.870**, Seventh Dimension: **0.829**, and Eighth Dimension: **0.848**. All correlation coefficient values were statistically significant at the level of (0.01), indicating a high degree of internal consistency for the dimensions.

Reliability of the Questionnaire

The reliability of the questionnaire was calculated using Cronbach's alpha and the split-half method with the Spearman-Brown formula. The results of the reliability coefficients for the study sample are as follows: For the first dimension, the Cronbach's alpha was **0.955**, the second dimension was **0.956**, the third dimension was **0.957**, the fourth dimension was **0.957**, the fifth dimension was **0.954**, the sixth dimension was **0.979**, the seventh dimension was **0.967**, the eighth dimension was **0.978**, and the overall reliability of the questionnaire was **0.992**. The Spearman-Brown coefficients for the dimensions were **0.915**, **0.934**, **0.938**, **0.938**, **0.943**, **0.958**, **0.912**, **0.934**, and the overall reliability was **0.941**. These reliability values are considered acceptable, providing confidence in using the questionnaire to assess the extent to which students at the College of Education at Taibah University possess the competencies necessary for teaching with computers. This reflects the homogeneity of the items in representing the behavior being measured.

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Second: The Achievement Test

The achievement test was developed to assess the cognitive aspects of competencies related to using computers in teaching, based on previously defined competencies. It consists of **60 multiple-choice questions** designed to evaluate cognitive abilities according to Bloom's taxonomy, specifically in the areas of Remembering, Understanding, and Applying. The questions cover specific topics, including presentation software, spreadsheet software, information networks, information technology (IT), the Windows operating system, and word processing software.

To ensure the validity of the test, both apparent validity and content validity were confirmed through expert review. The reliability of the test was established by administering it and subsequently re-administering it to a sample of **50 students**, resulting in a high reliability coefficient of **0.989**, indicating a strong consistency in the test results.

Results of the Study

First: Results of the Computer Competencies Questionnaire

This research aimed to answer the questions it addressed, and below are the findings related to these research questions.

Regarding the first question, which asks about the necessary competencies for using computers in the teaching process, this was answered through the theoretical framework and the procedures for developing the computer teaching competencies questionnaire. A list of competencies specific to computer-assisted teaching was established, from which the first tool of the study, the computer teaching competencies questionnaire, was derived.

As for the second question, "To what extent do students at the College of Education at Taibah University possess the competencies for using computers in the teaching process?" Table (5) presents the results of the questionnaire across all dimensions for the total study sample, which consisted of **200 students** from the humanities and **35 students** from the sciences. It is worth noting that detailed results for each dimension are included in the appendices.

Table (1). Results of the Questionnaire for All Sample Participants (N = 235)

Dimension	Item	Mean	St. Dev.	Chi-square	Sig.
First	Competencies Related to Computers and Their Importance in Education.	2.08467	0.9595	44.084	0.01**
Second	Competencies Related to Information Technology.	1.9383	0.8995	71.242	0.01**
Third	Competencies Related to Using Computers in Teaching.	1.8332	0.7896	99.678	0.01**
Fourth	Competencies Related to Information Networks and Email and Their Uses in Teaching.	1.8857	0.8733	80.46	0.01**
Fifth	Competencies Related to Operating and Utilizing the Microsoft Windows Operating System in Teaching.	1.8475	0.8567	95.007	0.01**
Sixth	Competencies Related to Using Microsoft PowerPoint Presentation Software in Teaching.	1.79702	0.8739	96.268	0.01**

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Seventh	Competencies Related to Using Microsoft Excel Spreadsheet Software in Teaching.	1.68793	0.751774	135.381	0.01**
Eighth	Competencies Related to Using Microsoft Word Word Processing Software in Teaching.	1.7846	0.876486	91.55	0.01**

Table (5) presents the descriptive statistics, including the mean, standard deviation, and the Chi-square (χ^2) value for the responses of the study sample (scientific and literary students) regarding their perceived benefits from their university education at Taibah University in effectively using computer programs. The sample's responses showed the highest mean in statement (8), which states, "I recognize the important roles of computers in assessing student learning," from the axis "Competencies Related to the Importance of Computers in Education," with a mean of (2.1660) and a standard deviation of (0.91644). The lowest mean was found in statement (10) from the axis "Competencies Related to Using Excel Spreadsheets," stating, "I use the merge cells feature to create breaks and titles for tables," with a mean of (1.5702) and a standard deviation of (0.65890). There was a statistically significant Chi-square value, indicating a diversity in the sample's opinions on the benefits of their university education in enhancing their computer skills.

For the first axis (Competencies Related to Computers and Their Importance in Education): the highest mean was again in statement (8), with a mean of (2.1660) and a standard deviation of (0.91644). The lowest mean was in statement (9), "I recognize the important roles of computers in diversifying students' learning resources," with a mean of (2.0340) and a standard deviation of (0.98217).

For the second axis (Competencies Related to Information Technology): the highest mean was in statement (1), "I know the history of computer development," with a mean of (2.0723) and a standard deviation of (0.02900). The lowest mean was in statement (4), "I distinguish between computer storage media: (RAM, ROM, HD, FD, CD ROM, TAPES...)," with a mean of (1.6894) and a standard deviation of (0.84308).

For the third axis (Competencies Related to Using Computers in Teaching): the highest mean was in statement (1), "I select necessary multimedia educational tools," with a mean of (2.0298) and a standard deviation of (0.87898). The lowest mean was in statement (11), "I design electronic teaching presentations using common presentation software," with a mean of (1.7021) and a standard deviation of (0.71953).

For the fourth axis (Competencies Related to the Internet and Email and Their Uses in Teaching): the highest mean was in statement (20), "I browse multiple websites simultaneously," with a mean of (2.0340) and a standard deviation of (0.98217). The lowest mean was in statement (10), "I deal with independent or affiliated electronic libraries of educational institutions," with a mean of (1.7404) and a standard deviation of (0.71362).

For the fifth axis (Competencies Related to Operating and Using Microsoft Windows in Teaching): the highest mean was in statement (1), "I use operating system tools (Windows) such as: (programs menu, documents, control panel...)," with a mean of (2.0596) and a standard deviation of (1.00249). The lowest mean was in statement (7), "I use security programs to scan and remove viruses," with a mean of (1.7277) and a standard deviation of (0.83862).

For the sixth axis (Competencies Related to Using Microsoft PowerPoint in Teaching): the highest mean was in statement (1), "I prepare a main presentation slide," with a mean of (1.8426) and a standard deviation of (0.94998). The lowest mean was in statement (10), "I use the feature to hide text with the letters 'w' or 'b' during the presentation," with a mean of (1.6936) and a standard deviation of (0.85720).

For the seventh axis (Competencies Related to Using Microsoft Excel in Teaching): the highest mean was in statement (1), "I print the data in the table," with a mean of (1.8809) and a standard deviation of (0.91208). The lowest mean was in statement (10), "I use the merge cells feature to create breaks and titles for the table," with a mean of (1.5702) and a standard deviation of (0.65890).

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For the eighth axis (Competencies Related to Using Microsoft Word in Teaching): the highest mean was in statement (4), "I cut and copy text," with a mean of (1.9106) and a standard deviation of (1.00240). The lowest mean was in statement (9), "I deal with the text box," with a mean of (1.6723) and a standard deviation of (0.75041).

Based on these results, the researchers conclude that the level of benefit students derive from their education in computer competencies varies, and the university's contribution to preparing its students to effectively use computers across different domains differs based on variables such as specialization. This is further evidenced by the responses to the other questions. These findings align with studies by Csapó, Bennett, Latour, & Law (2011), Shute & Rahimi (2017), Morral (2001) in Mexico, Al-Ajlouni (2001) in Jordan, and Al-Hadlq (2002) in Kuwait, which highlighted disparities in the benefits of educational programs provided by institutions based on students' specializations, orientations, and available resources.

To address the second question, "What is the difference between the responses of literary students compared to those of scientific students on the items of the questionnaire?" Table (6) illustrates these differences.

After administering the questionnaire to 200 literary students and 35 scientific students, statistical analysis was conducted, and the results are presented in Table (6).

Table (2). Differences Between the Responses of Literary and Scientific Students on The Axes of The Questionnaire

Dimension	Literature Students		Science Students		t-value	Sig.
	Mean	St. Dev.	Mean	St. Dev.		
Competencies Related to Computers and Their Importance in Education.	20.505	8.175	22.800	7.564	1.548	.123
Competencies Related to Information Technology.	19.180	7.867	20.542	6.074	.975	.331
Competencies Related to Using Computers in Teaching.	19.740	7.305	22.600	6.800	2.158	.032
Competencies Related to the Internet and Email and Their Uses in Teaching.	45.740	18.752	55.171	19.098	2.738	.007*
Competencies Related to Operating and Using Microsoft Windows in Teaching.	200	19.770	35	23.48	2.431	.016
Competencies Related to Using Microsoft PowerPoint in Teaching.	17.575	8.1748	20.228	6.885	1.810	.072
Competencies Related to Using Microsoft Excel in Teaching.	16.271	6.574	20.342	5.950	3.424	.001*
Competencies Related to Using Microsoft Word in Teaching.	22.715	10.309	25.97	9.105	1.752	.081
The Questionnaire as a Whole.	181.281	64.842	211.14	62.146	2.528	.012

Table (6) shows that most student responses do not have statistically significant differences, and the largest difference favoring science students is in the seventh axis, 'Competencies Related to the Use of Microsoft Excel Spreadsheet Program in Teaching,' where the average for science students is 20.3429 compared to 16.2714 for literary students, with a t-value of 3.424 and significance at the 0.001 level. Similarly, in the fourth axis, 'Competencies Related to Information Networks and Email and Their Uses in Teaching,' the average for science students is 55.1714 compared to 45.7400 for literary students, with a t-value of 2.738 and significance at the 0.007 level. This seems natural as the internal items of both of these axes include skills that are more aligned with the scientific side than the literary side; most items in the seventh axis relate to the technical use of Microsoft Excel spreadsheet program, while most items in the fourth axis relate to

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the scientific use of the Internet and email, both of which are more connected to scientific study than literary study. To determine the difference between the responses of science students and literary students in the overall questionnaire, Table (7) illustrates the nature of this difference:

Table (3). Significance of the Difference Between Responses of Science Students and Literary Students in the Computer Competencies Questionnaire.

t-test for Equality of Means									
95% Confidence Interval of the Difference		Std. Error Mean	Mean Difference	Sig. (2-tailed)	Difference	t	Sig.	F	
Upper	Lower								
-6.41445	-52.89127	11.79496	-29.65286	.013	233	-2.514	.729	.120	values
-6.61093	-52.69479	11.45909	-29.65286	.013	47.848	-2.588			

Table (7) shows that the value of "t" equals 2.5, which is statistically significant at the level of 0.013. This indicates that the difference between the responses of science students and those of literature students is a statistically significant difference, favoring science students. From this, we conclude that the attitudes and inclinations of science students are more positive than those of literature students. This is a natural result given the nature of the studies undertaken by science students, which require calculations and logical and analytical thinking—functions in which computers can significantly assist these students.

In contrast, literature students still reflect positive attitudes towards computer competencies, but these do not reach the level of competencies seen in science students. This is evident in the items where literature students' responses were concentrated; most positive responses were focused on using the information network and word processing programs, while most responses from science students were concentrated on using calculation programs and presentation software, as well as web browsing and word processing programs.

This result aligns with the findings of Al-Omari (2009), which indicated that computer competencies were available at a moderate level among secondary school teachers in Al-Mukhwah province, Saudi Arabia. It also corresponds with the results of Al-Nabi (2010), which highlighted weak computer competencies among basic education teachers in Oman, and Nelson's study (2008), which showed that higher education institutions suffer from the inefficiency of faculty members and students in using e-learning technologies. Additionally, the study by Arman (2007) in Palestine found that the computer skills of graduate students at Al-Quds University were at a moderate level.

Second: Results of the Computer Teaching Competencies Test: The test was administered to the same sample that responded to the computer usage competencies questionnaire, consisting of 200 literature students and 35 science students. The test was applied to the research sample, and percentiles were used to analyze the results. Table (8) presents these differences.

Table (4). Percentile Differences Between Students of the Two Groups in the Computer Teaching Competencies Test.

Percentiles	**5**	**10**	**25**	**50**	**75**	**90**	**95**	**Total Score of the Test**
Literature Students	18	20	25	33	45	55	59	100
Science Students	36	38	47	52	58	68	78	100

It is evident from the previous table that the students in the literary stream who scored the lowest (18 out of 100) performed better than 5% of the literary sample, while those who scored the highest (59 out of 100) performed better than 95% of the literary sample. As for the students in the scientific stream, those who scored the lowest (36 out of 100) performed better than 5% of the scientific sample, and those who

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scored the highest (78 out of 100) performed better than 95% of the scientific sample. This indicates the low scores of the study sample in the computer teaching competency test, although the scores of the scientific students are somewhat better than those of the literary students. Table (9) illustrates the percentage differences between the two groups of students in the computer teaching competency test:

Table (5). Percentage Differences Between Scientific and Literary Students in the Computer Teaching Test

Average error of standard deviation	Std. Deviation	Mean	No.	Category
.98502	13.93034	36.105	200	**Literary**
1.79111	10.59634	53.200	35	**Scientific**

Table (9) shows that the average score of the scientific students is 53.2%, while the average score of the literary students is 36.1%, indicating a significant difference between the two groups. To determine the significance of this difference, the value of "t" was calculated between the two groups using the independent two-sample t-test. Table (10) illustrates the significance of this difference:

Table (6). Significance of the Difference Between Scientific and Literary Students' Responses in the Computer Teaching Test

t-test for Equality of Means									
95% Confidence Interval of the Difference		Std. Error Mean	Mean Difference	Sig. (2-tailed)	Difference	t	Sig.	F	
Upper	Lower								
-12.223	-21.966	2.472	-17.095	.000	233	-6.914	.025	5.090	values
-13.001	-21.188	2.044	-17.095	.000	56.789	-8.363			

Table (10) indicates that the value of "t" is 8.36, which is significant at the 0.000 level. This level shows that the difference between the responses of scientific students and those of literary students is highly significant, favoring the scientific students. From this, we conclude that the practical competencies of scientific students in teaching with computers are greater than those of literary students. This result is consistent with most previous studies, such as the study by Al-Zahrani (2009), which showed that teaching competencies in computer use are highly available among high school mathematics teachers, increasing with years of experience. Additionally, the study by Abdul Karim (2000) indicated a high level of Competencies among mathematics and science teachers in using the Internet, while the study by Kiosada (2001) demonstrated an improvement in the performance of mathematics teachers following professional development programs via the Internet.

It appears that the nature of the work of student teachers in scientific disciplines is more closely related to the use of computers, for displaying images, presentations, performing calculations, solving equations, and illustrating differences in geometric shapes and logical structures. In contrast, the nature of literary studies relies heavily on direct communication, verbal influence, and the teacher's personality, voice modulation, gestures, and non-verbal cues, rather than on specific presentations. This aligns with the study by Al-Mohaya (2002), which revealed a lack of technical competencies in computer and Internet use among students at the College of Education in Abha.

Third: Results of the Correlation Between Student Responses in the Questionnaire and the Test

To determine whether there is a correlation between students' attitudes toward computer use and their actual scores in the computer teaching test, the correlation coefficient was calculated, as shown in Table (11) for literary and scientific students.

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Table (7). Correlation coefficient Between Student Responses in the Questionnaire and Scores in the Computer Teaching Test for Literary and scientific Students

Literary Test	**Literary Questionnaire**		
.026	1	Pearson's coefficient	**Literary Questionnaire**
.712		Significance	
200	200	Number	
1	.026	Pearson's coefficient	**Literary Test**
	.712	Significance	
200	200	Number	
Scientific Test	**Scientific Questionnaire**		
.067	1	Pearson's coefficient	**Scientific Questionnaire**
.701		Significance	
35	35	Number	
1	.067	Pearson's coefficient	**Scientific Test**
	.701	Significance	
35	35	Number	

From Table (11), it is evident that the Pearson correlation coefficient between the responses of literary students in the questionnaire and their responses in the computer teaching test equals 0.26, which indicates a high level of significance at 0.120. The correlation coefficient between the responses of scientific students in the questionnaire and their responses in the computer teaching test equals 0.67, demonstrating a high level of significance at 0.001. This indicates that the attitudes of student teachers towards using computers are positively correlated with their competencies in teaching using computers. This means that as the student teacher's interest and inclination towards using computers increase, their competencies in applying this knowledge and tendency to use computers in teaching also increase.

This aligns with the findings of Shantawi (2007), which highlighted the poor performance of teachers based on student perceptions at Yarmouk University. It also agrees with the results of the study by Moural (2001), which showed that those with experience in using computers are more motivated to use computers in teaching than those with less experience. However, it contrasts with the results of the study by Al-Ma'awali (2000), which indicated that Omani teachers possess significant technical competencies but practice them at a low level. This discrepancy may be due to other variables related to the nature of the educational, social, and economic system in the Sultanate.

Recommendations

Based on the results of the study, we present the following recommendations:

- It is essential to focus on the description of the course on teaching methods using computers across various courses at Taibah University in particular and Saudi universities in general. This alignment will ensure that the skills required from the student teacher during practical education are consistent with the actual competencies they possess in using computers.

- The Computer 101 course, which is offered as a general course for all university students, should be integrated with the nature of the student teachers' work in the College of Education by emphasizing the programs and software they will use during their teaching training.

- A qualitative shift in computer teaching courses should be made by strengthening the practical aspect more than the theoretical one. This can be achieved by reducing the theoretical burden on students and redirecting their efforts towards creativity in lesson preparation and execution using computers.

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- It is important to assign the course on using computers in education to each specific specialty in education individually and avoid offering it as a general course. This is because each specialty has its own requirements and unique software suitable for its content. Consequently, this approach will enhance the student's theoretical and practical benefit from the course.

- Modern educational books in the field of using computers in education should be utilized due to their attractiveness, high-quality printing, and incorporation of advancements in technology within specialized fields. Some of these materials are structured on the internet, while others are equipped with test generation mechanisms and support presentations using various programs such as Director and Authorware.

- There should be a move towards utilizing social media applications to enhance the teaching of various subjects, utilizing programs and platforms such as Facebook, Twitter, blogs, wikis, webcasts, and Flicker.

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Appendix

Table (5). Questionnaire Results for All Sample Members (N = 235)

First: Competencies Related to Computers and Their Role in Education

No.	Statement	Mean	Standard Deviation	Chi-Square (χ^2)	Significance Level
1	University studies helped me recognize the advantages of using computers in education.	2.0894	0.99383	36.92	0.01**
2	I am able to justify the use of computers in education.	2.1106	1.00665	30.69	0.01**

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No.	Statement	Mean	Standard Deviation	Chi-Square (χ^2)	Significance Level
3	I can identify different patterns of using computers in education.	2.0340	0.91457	51.38	0.01**
4	I understand the main roles of computers as an educational aid (CAI).	2.1064	1.01346	30.55	0.01**
5	I recognize the role of computers in managing the educational process (CMI).	2.0723	0.98226	37.07	0.01**
6	I understand the role of computers in individualized learning.	2.0511	0.99009	40.29	0.01**
7	I realize the importance of computers in promoting self-learning and collaborative learning.	2.1489	0.90532	48.42	0.01**
8	I recognize the role of computers in student learning assessment.	2.1660	0.91644	61.32	0.01**
9	I understand the role of computers in diversifying learning resources for students.	2.0340	0.98217	49.41	0.01**
10	I recognize the role of computers in blending traditional and modern teaching methods (blended learning).	2.0340	0.89090	54.79	0

Part 2. Competencies Related to Information Technology

No.	Statement	Mean	Standard Deviation	Chi-Square (χ^2) Value	Significance
1	I know the history of computer development.	2.0723	1.02900	47.29	0.01**
2	I have developed the ability to operate peripheral devices (printers, scanners, etc.).	2.0596	0.91326	48.49	0.01**
3	I am proficient in using the main keys on the keyboard.	1.9915	0.87213	61.94	0.01**
4	I can distinguish between different storage media (RAM, ROM, HD, FD, CD-ROM, tapes, etc.).	1.6894	0.84308	126.69	0.01**
5	I can search for information from various sources (discs, websites, virtual libraries).	1.8936	0.88274	77.94	0.01**
6	I can select and organize information via computer.	1.9532	0.89749	61.53	0.01**
7	I can use educational software for self-directed learning (acquisition, support, and remediation).	1.9277	0.84674	74.57	0.01**
8	I can adapt to new software with the help of guides.	1.9574	0.93730	66.26	0.01**
9	I can select the appropriate tools and technologies for a project.	1.9574	0.89532	68.85	0.01**
10	I can apply appropriate tools and technologies to complete a project.	1.8809	0.87867	78.86	0.01**

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Part 3. Competencies Related to Computer Integration in Teaching

No.	Statement	Mean	Standard Deviation	Chi-Square (χ^2) Value	Significance
1	I can select essential multimedia instructional aids.	2.0298	0.87898	59.79	0.01**
2	I can enrich educational situations using computers or the internet.	1.8298	0.79848	94.52	0.01**
3	I can convert course content into simple e-learning lessons.	1.8766	0.83056	82.43	0.01**
4	I use computer programs to write scientific formulas in my field of study.	1.7915	0.75894	111.64	0.01**
5	I design educational brochures using computer programs in my field of study.	1.8255	0.76193	103.64	0.01**
6	I use computer programs to create and print exams.	1.8596	0.85826	79.81	0.01**
7	I design and manage exams using computer programs.	1.8681	0.81888	87.23	0.01**
8	I apply computer-based learning strategies to teach my subject.	1.7574	0.74872	116.30	0.01**
9	I can distinguish between different alternatives for using computers in teaching (practice, tutoring, problem-solving, simulation, etc.).	1.8043	0.77071	102.45	0.01**
10	I can design and implement lesson plans that utilize selected software packages based on learner needs, course content, and expected outcomes.	1.8213	0.74102	118.82	0.01**
11	I design electronic teaching presentations using popular presentation software.	1.7021	0.71953	139.83	0.01**

Fourth: Competencies Related to the Internet, Email, and Their Use in Teaching

No.	Statement	Mean	Standard Deviation	Chi-Square Value	Significance
1	I can identify the use of the Internet in education.	2.0043	1.01904	46.52	0.01**
2	I can determine methods for integrating computers and the Internet into education and curricula.	1.9702	0.87898	64.05	0.01**
3	I can use online information sources (electronic dictionaries, libraries, catalogs, etc.).	1.9319	0.90325	64.08	0.01**
4	I can perform all steps to connect a computer to the Internet.	1.9106	0.87492	70.31	0.01**
5	I can identify types of networks.	1.9362	0.89166	77.69	0.01**

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No.	Statement	Mean	Standard Deviation	Chi-Square Value	Significance
6	I can use search engines to browse websites.	1.9660	0.95570	60.20	0.01**
7	I can troubleshoot and fix minor Internet connection issues.	1.9106	0.91783	70.55	0.01**
8	I have an email account and can use it effectively.	1.8298	0.91332	87.23	0.01**
9	I can communicate via audio and video using Internet chat programs.	1.8213	0.85358	90.33	0.01**
10	I can use independent or institutional electronic libraries.	1.7404	0.71362	129.55	0.01**
11	I can download books and programs from the Internet.	1.8255	0.85196	89.92	0.01**
12	I can use online lessons in my teaching.	1.8255	0.85696	87.30	0.01**
13	I can use Internet browsers (e.g., Internet Explorer, Netscape).	1.8553	0.85505	86.11	0.01**
14	I can manage my blog.	1.8255	0.80555	91.55	0.01**
15	I can manage my official educational website.	1.8468	0.84854	85.09	0.01**
16	I can register and participate in educational forums.	1.8213	0.72940	112.18	0.01**
17	I can filter unwanted emails.	1.9277	0.89100	66.29	0.01**
18	I can download and upload files on the Internet.	1.8298	0.79311	107.11	0.01**
19	I can search for words or phrases within web pages.	1.9191	0.85601	72.59	0.01**
20	I can view multiple websites simultaneously.	2.0340	0.98217	51.79	0.01**
21	I understand the components of an email address.	1.9617	0.85898	76.54	0.01**
22	I understand the elements of an email message.	1.9404	0.93179	65.41	0.01**
23	I can compose and send emails.	1.8681	0.87927	80.90	0.01**
24	I can insert images into emails.	1.8128	0.87648	92.88	0.01**
25	I can attach documents to emails.	1.8298	0.89441	85.49	0.01**

Fifth. Competencies Related to Using Microsoft Windows in Teaching

No.	Statement	Mean	Standard Deviation	Chi-Square Value	Significance
1	I can use Windows tools (e.g., program lists, documents, control panel).	2.0596	1.00249	39.40	0.01**
2	I can manage files (delete, move, copy, rename).	1.8723	0.82734	83.79	0.01**
3	I can operate programs (open, close, switch between programs).	1.8298	0.78226	100.75	0.01**

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No.	Statement	Mean	Standard Deviation	Chi-Square Value	Significance
4	I can install software and applications.	1.8340	0.84360	93.97	0.01**
5	I can save non-text data (images, audio, video files).	1.8766	0.87565	96.83	0.01**
6	I can uninstall programs.	1.8553	0.86499	96.46	0.01**
7	I can use antivirus programs.	1.7277	0.83862	124.71	0.01**
8	I can compress and extract files.	1.7830	0.82672	109.83	0.01**
9	I can manage different storage units (e.g., hard disks, CDs).	1.7872	0.85575	101.69	0.01**
10	I can organize files into folders.	1.8213	0.80727	104.97	0.01**
11	I can use media players (e.g., Media Player, RealPlayer).	1.8766	0.89972	92.68	0.01**

Sixth. Competencies Related to Using Microsoft PowerPoint in Teaching

No.	Statement	Mean	Standard Deviation	Chi-Square Value	Significance
1	I can create a master slide.	1.8426	0.94998	82.80	0.01**
2	I can prepare a basic presentation with text and graphics.	1.7915	0.89820	96.39	0.01**
3	I can add audio to presentations.	1.8085	0.88284	92.47	0.01**
4	I can add slide transitions.	1.8085	0.81750	94.28	0.01**
5	I can produce a variety of teaching transparencies.	1.7957	0.81176	100.03	0.01**
6	I can print multiple slides on one page.	1.7447	0.82348	109.83	0.01**
7	I can insert charts into educational slides.	1.8383	0.89599	83.28	0.01**
8	I can use custom templates to differentiate my lessons.	1.8255	0.87180	87.30	0.01**
9	I can use text highlighting during presentations.	1.8213	0.93025	88.08	0.01**
10	I can hide text during presentations using the "W" or "B" key.	1.6936	0.85720	128.22	0.01**

Seventh. Competencies Related to Using Microsoft Excel in Teaching

#	Statement	Mean	Standard Deviation	Chi-square (χ^2)	Significance
1	Printing data from the table.	1.8809	0.91208	73.99a	0.01**
2	Entering formulas into table cells based on cell references.	1.7149	0.74506	123.86	0.01**
3	Changing text properties in table cells.	1.7021	0.77114	131.04	0.01**
4	Formatting table borders and cells.	1.7404	0.72550	133.09	0.01**

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#	Statement	Mean	Standard Deviation	Chi-square (χ^2)	Significance
5	Sorting data within the table.	1.7319	0.81154	113.31	0.01**
6	Converting table data into charts and images.	1.6426	0.71604	154.67	0.01**
7	Using the auto-sum feature for data.	1.6325	0.74808	144.60	0.01**
8	Calculating the mean and standard deviation of data.	1.6085	0.71007	156.37	0.01**
9	Using the track changes feature in the document.	1.6553	0.71933	142.92	0.01**
10	Merging cells to create sections and table headers.	1.5702	0.65890	179.96	0.01**

Eighth. Competencies Related to Using Microsoft Word in Teaching

#	Statement	Mean	Standard Deviation	Chi-square (χ^2)	Significance
1	Saving documents.	1.8723	0.96115	77.596a	0.01**
2	Performing all types of document printing.	1.8681	0.90325	92.336a	0.01**
3	Modifying text properties (font type, size, color, etc.).	1.7702	0.89058	105.409a	0.01**
4	Moving and copying text.	1.9106	1.00240	68.983a	0.01**
5	Inserting and managing images in a document.	1.8000	0.91894	93.902a	0.01**
6	Inserting and managing tables in a document.	1.7660	0.89664	103.366a	0.01**
7	Modifying paragraph properties (alignment: left, right, center, etc.).	1.8723	0.92489	81.749a	0.01**
8	Correcting spelling errors.	1.6979	0.77225	131.485a	0.01**
9	Working with text boxes.	1.6723	0.75041	149.766a	0.01**
10	Searching and replacing text.	1.8000	0.86132	100.234a	0.01**
11	Selecting, copying, and pasting (paragraphs, images, etc.).	1.7574	0.82476	108.813a	0.01**
12	Adding page numbers to the Word file.	1.7191	0.86099	127.366a	0.01**
13	Inserting a table into the Word document.	1.6936	0.82674	133.528a	0.01**