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Information Literacy Level Among Computer Teachers and its Reflection on the Quality of the Educational Process

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Abstract

The purpose of this research is to determine the level of computer teachers' information literacy and its reflection on the quality of the educational process in public secondary schools. They need to develop crucial skills in this Information Age, whereby they can effectively access and evaluate the information needed for technology in education and learning settings, which is actually information literacy. Despite the incremental integration of information and communication technologies in education systems worldwide, little empirical evidence exists on how teachers' information literacy competencies translate into instructional quality — particularly in developing educational contexts. The objective of this research is to determine the extent of information literacy among computer teachers and its effect on the quality of the educational process. A quantitative descriptive–correlational research design was utilized to determine the relationship between dimensions of information literacy and teaching quality indicators. Data were collected using a structured questionnaire covering information literacy dimensions, including information access, evaluation, usage, and ethical/legal awareness in the classroom, and educational quality indicators, including instructional planning, teaching effectiveness, and student engagement, from a target population of 211 computer teachers at public secondary schools in Baghdad, Iraq. Statistical analyses included descriptive statistics, Pearson correlation, multiple regression analysis, and structural equation modeling (SEM) with SPSS and AMOS version 23. The findings reveal that the level of computer teachers' information literacy is high ($M = 3.88$), and the quality of the educational process is also high ($M = 3.92$), with a significant correlation between information literacy and teaching quality ($r = 0.67$, $p < 0.001$). Results of regression analysis showed that information literacy accounted for 48% of the variance in teaching quality, while results of structural equation modeling with maximum likelihood revealed an effect of 50% within the structural model. Information usage skills, among the dimensions of information literacy, were found to be the most significant predictor of instructional quality, while evaluation skills, access skills, and ethical awareness followed closely behind. It advances research on education by evidencing that information literacy operates as a key pedagogical capacity rather than a mere technical capacity. These findings underscore the need to further develop teachers in their use of digital information in the classroom in terms of assessing and effectively implementing it. It also includes evidence-based recommendations for curriculum, teacher training, and education policy, linking the need for some type of information literacy framework in the professional development curriculum.

Keywords: computer teachers, quality of education, vocational teacher education, teaching quality, information literacy

1. INTRODUCTION

With the information explosion taking place in the current digital age, information literacy (IL) has become one of the major competencies that educators must cultivate in order to utilize information more efficiently in teaching settings. This involves realizing the significance of accessing, evaluating, and presenting information in balance with curriculum and pedagogical methods; educators also recognize the need to refine the practice of IL [1]. The emergence of information and communication technologies (ICT) for educational purposes has brought considerable changes in pedagogical practices, requiring teachers to have higher-level skills to effectively handle and exploit digital resources. Various studies across the globe show that teachers who possess information literacy skills are better able to create engaging lessons, effectively assess student learning, and promote the development of critical thinking skills in students [2, 3].

Despite the growth in technological acceptance in school classrooms in Iraq, scarce empirical evidence exists about the information literacy of computer educators and the influence of these competencies on the overall quality of the educational process. Computer literacy is an indispensable part of the secondary school curriculum; thus, knowing this linkage is vital to improving effectiveness in teaching and ensuring that educational outcomes are in line with international needs [4].

Although information technology infrastructure has continued to develop in Iraqi schools, there remains a knowledge-practice gap. The same teachers who have acquired technology might potentially lack the necessary information literacy skills to employ the technology in pedagogy. Early research observations and teacher interviews in Baghdad reveal that while teachers appear to have basic ICT skills, they also have limited skills in assessing digital information, embedding information in lessons, and implementing ethical and legal guidance for content use. These gaps can result in variability in the quality of instruction and the learning experiences of students.

Hence, it is important to study the competencies of computer teachers regarding the present state of information literacy and the quality of the educational process.

This study aims to investigate computer teachers' information literacy in Baghdad public secondary schools and examine its impact on the quality of teaching. Specifically, the study aims to:

1. Include teachers' competencies to access, evaluate, use, and communicate information, as well as understand and respect the legal and ethical use of information.
2. Determine the effectiveness and quality of the educational process involving instructional planning, teaching, and student engagement.
3. Establish the depth and type of relationship between information literacy and teaching quality through correlation analysis.
4. Inform professional learning, policy, and curriculum with evidence.

The study aims to address the following main questions:

1. How far are computer teachers in Baghdad public secondary schools aware of information literacy?
2. What are the various aspects of information literacy, including access, evaluation, usage, and ethical/legal use, in which computer teachers excel?
3. How do computer teachers perceive the level of quality practice in the arrangements of the educational process?
4. Does the information literacy of teachers have a statistically significant impact on the quality of their educational process?
5. Which factors of information literacy are most predictive of teaching quality?

According to the research questions, the following hypotheses were constructed:

H1: Information literacy has a positive and significant impact on the quality of the educational process.

H1a: Teaching quality is positively affected by information access skills.

H1b: Teaching quality is positively influenced by information evaluation skills.

H1c: Information usage skills have a positive role in teaching quality.

H1d: Ethical and legal use has a positive impact on teaching quality.

This study is important for several reasons:

1. Contribution to the Field: It connects the theoretical literature on information literacy to a growing literature on measuring quality in education, while contextualizing it to the Iraqi setting, contributing to the global literature on educational research.
2. Policy Implications: The findings provide evidence-based information that policymakers require in order to enhance teacher-training programmes and align them with information literacy standards by incorporating such standards into their curricula.
3. Practical Impact: The results identify areas of high and low proficiency in computer teachers' competencies, enabling the direction of professional development initiatives and instructional design decisions.
4. Global Alignment: Facilitating the implementation of 21st-century teaching standards so that what happens in Iraqi classrooms aligns more closely with what happens in classrooms around the world.

The scope of the study is as follows:

- The study focuses on computer teachers in public secondary schools in Baghdad, Iraq.
- Dimensions of information literacy considered include information access, evaluation, usage, and ethical/legal awareness.
- Quality of the educational process is measured in terms of instructional planning, teaching effectiveness, and student engagement.

The delimitations of the study are as follows:

1. Moreover, the study is confined to Baghdad and, as such, its findings may not generalize to rural areas.
2. Possible biases are related to self-reported data, including questionnaires as the source of the data, and the self-reported nature of the data collection may involve a tendency for people to overreport or underreport a characteristic depending on how socially desirable it is to have that characteristic.
3. It was a cross-sectional design, which means the characteristic and the outcome were not measured over time; longitudinal and cross-sectional effects were not measured.
4. As only computer teachers were taken into consideration, the result may not reflect what is true for teachers of other subjects.

2. LITERATURE REVIEW

Information literacy is one of the most crucial competencies that any modern educational system demands. Given the proliferation of digital technologies, along with the substantial increase in possible sources of information, teachers are now required not only to find information but also to assess, analyze, and synthesize information in their practices. Information literacy is broadly defined as the capacity to identify an information need and to efficiently and ethically locate, evaluate, and use information [5].

A frequently cited definition is the one given by the Association of College and Research Libraries, defining information literacy as integrated abilities covering the reflective discovery of information, the understanding of how information is produced and valued, and the ethical use of information in the creation of new knowledge [6].

Ideally, information literacy is studied from the perspective of constructivist learning theory, where the learner is thought to interact with information resources to construct knowledge. Thus, teachers are crucial in helping students manage these complex and often confusing information landscapes. This then positions information literacy itself as a cognitive skill, but equally as a pedagogical practice, allowing teachers to facilitate inquiry, analysis, and critical thinking – all aspects of information literacy [7].

Another conceptualization often applied to explain information literacy is information processing theory, which concerns how communication receivers receive, interpret, store, and retrieve information they consume. This view posits that information literacy is essential to the creation of the highest levels of thinking, higher-order thinking, because teachers can transform information into meaningful knowledge that can be used and applied educationally [8].

Information literacy has also been framed more recently as a phase topic in relation to digital literacy and within knowledge management frameworks, with an emphasis on its strategic importance in education systems that are heavily reliant on digital technology. Increasingly, researchers note that information literacy is far more than a technical skill; instead, it is a multidimensional skill with cognitive, ethical, and technological components [9].

As such, building the capacity of teachers with robust information literacy skills is the bedrock of ensuring that the integration of technology in education leads to meaningful learning and not just meaningless use of digital tools [10].

Information literacy is accepted as a construct with multiple related components. These aspects combine to allow users to engage with information in increasingly complicated digital environments [11].

Interestingly, most recent models recognize four main areas for literacy [1].

Information Access: Accessing information encompasses identifying information needs and searching for sources of relevant information. Exemplary teachers must be skilled in searching academic databases, digital libraries, and online educational platforms. The ability to identify, choose, and evaluate different search strategies, combined with the capacity to find and employ relevant keywords and critique the reliability of information, are key aspects of information access [12].

Information Evaluation: One of the most important components of information literacy is information evaluation. With so much information found online in this digital age, teachers must be able to evaluate the credibility, accuracy, and relevance of information sources. This includes assessing the credibility of digital content, such as who the authors are, the reliability of the publications, and whether there may be any type of inherent bias [13].

Critical thinking is even more fundamental for education because educators are filters for knowledge as they sift through realities to package knowledge for students. Misinformation and subpar content can slip into the learning space without robust evaluation skills [14].

Information Usage: Information usage represents the capacity to use information appropriately in an educational context. This includes the use of digital resources while planning a lesson, designing engaging learning activities, and presenting information in ways that enable students to comprehend [15].

This dimension relates well to pedagogical innovation, as teachers who mobilize information resources more efficiently can more readily create active learning situations that support collaborative learning [16].

Ethical and Legal Use of Information: The second part of information literacy is ethical awareness. Educators require an understanding of intellectual property rights, copyright, and ethics concerning the use of information. While responsible citation practices are a fundamental concept, the nature of digital content, which is too easily copied, underlines both the need for knowledge about fair use as opposed to plagiarism and the means to identify digital ownership [17].

These skills also allow students to uphold academic integrity, which is important for a credible academic space [19]. Altogether, these dimensions comprise a more comprehensive description of how information literacy operates within educational contexts and its influences on pedagogical approaches [18].

Digital competence is a key 21st-century competence for educators. With the ever-growing number of educational institutes embracing digital learning platforms, educators should develop the skills to utilize technology effectively in their teaching practices [20].

Digital competence refers to the confident and responsible use of digital technologies for teaching, learning, and professional development. It covers several profiles, such as technology skills, pedagogical use, digital communication, and data literacy [21].

The Digital Competence Framework for Educators (DigCompEdu) is one of the most potent frameworks in this space developed by the European Commission. It is a framework that focuses on embedding technology in a form that transforms learning and changes pedagogical practices, showcasing technology integration as the intersection of technological knowledge and pedagogical knowledge to enable digital teaching practices [22].

Therefore, digitally competent teachers are defined as those who are able to design learning environments that are enhanced by technology, use digital tools to cater to different learning styles, use digital assessment tools to measure student output, and provide opportunities for collaborative learning online [23]. The literature demonstrates that teachers with greater digital competence are more effective, flexible, and better adapted to changes in educational environments [24].

In addition, there is also a strong connection between digital competence and information literacy. Digital competence refers to the scope of technological skills, whereas information literacy has more to do with information management and processing abilities. When taken together, these skills represent the pillars of digital pedagogy [25].

In recent years, educational quality has quickly become an important idea in educational research and policy debates around the world. This is called the quality of the educational process: the process of teaching and learning itself [26].

There are several indicators according to which the quality of education is often assessed: lesson planning and management, testing professionalism, student engagement, and learning outcomes [27].

In theory, quality of education can be seen through the input-process-output model based on how educational inputs, i.e., resources, affect educational processes, i.e., teaching practices, which in turn lead to educational outputs, i.e., learning outcomes [28]. Teachers have also been mentioned in this regard, reflecting the important role they have according to this framework for the quality of education. The effectiveness of classroom instruction is directly proportional to their competencies, teaching strategies, and mastery in utilizing information resources [29].

Contemporary educational quality frameworks also stress the notion of student-centered learning; it is no longer

sufficient merely to circle up to talk about what the lesson was; teaching practices are crafted to foster skills like critical thinking, problem-solving, and group learning. When students use learning approaches that require varied information sources and evaluating and applying knowledge, teachers with strong information literacy will assist by linking students to these sources and showing them how to evaluate and use what they find [30].

Studies show that teachers' capacities in digital skills and information processing are important for quality enhancements of educational processes. Utilization of information resources in teaching creates an interactive, engaging, and responsive learning environment when the teaching tasks are done in a meaningful manner [31].

Hence, since the quality of instruction depends to a large extent on the relationship between teacher information literacy and educational quality, it is important to identify its demand in order to improve instructional practices within the framework of a digital knowledge society [32].

Instruction is affected by a broad variety of interdependent factors shaping teaching and learning. Research for many decades has shown that good teaching is not only about what teachers know as content knowledge but also how well they teach through pedagogy, as well as their ability to use technology to teach through technopedagogy and their capacity to leverage resources to manage and create information through info-pedagogy [33].

To have a better quality of instruction, one must keep the fastest ways of the world constantly and ensure that teacher competency is one of the most influential factors upon the quality of instruction. Having a strong knowledge of pedagogy as well as the content area allows teachers to plan cohesive lessons, deliver content, and adapt their practices to the unique learning profiles of students. Furthermore, teachers can shapeshift in using the innovation process in their teaching styles to the extent that they have more competence than confidence [34].

Technology integration in teaching is another important factor. Most education has been digitalized nowadays, and teachers are expected to integrate digital tools into their instructional practices. As the framework of the European Commission on digital competence of educators suggests, meaningful use of technology needs to be combined with pedagogical knowledge and digital skills to allow teachers to build interactive learning environments [5].

Student engagement is also key to how good the instruction actually is. Students who are engaged will be actively involved in the learning activities, show high motivation, and achieve good academic results. Meaningful engagement is supported by teachers who have access to different information resources, digital platforms, and collaborative learning activities [6].

Beyond these, the most pressing factors behind instructional and learning quality are institutional conditions and access to educational resources. When schools offer sufficient technology infrastructure, digital-learning platforms, and professional-development opportunities, teachers are better able to adapt effective teaching strategies [7].

First, information literacy has become one of the mediating factors of teaching quality. A teacher with good information literacy can find good information, assess materials for teaching, and add knowledge to teaching. This enables them to implement learning experiences that facilitate critical analysis and greater comprehension among the student body [8].

Over the past several years, educational research has undertaken the role of information literacy in relation to teaching quality more deliberately. In the knowledge society rising on the digital wave, educators are no longer merely carriers of information but also guides to the construction of knowledge. As a result, efficient management of facts directly shapes the quality of educational practices [9].

The role of information literacy clarifies approaches to teaching quality in other ways. For one, it allows educators to source proven information and weave it into educational content, improving the quality and trustworthiness of teaching material. Teachers who have good skills in retrieving and evaluating information have a greater ability to find relevant resources that can meet curriculum goals and students' learning needs [10].

Second, strong information literacy engenders innovative pedagogies. Teachers with strong information literacy skills are more likely to incorporate digital tools, use multimodal resources, and provide lessons in an online course space. These kinds of integrative systems enable more blended learning spaces that encourage more student engagement [11].

Third, information literacy helps teachers to make better decisions. Through the critical assessment of knowledge and academic information, teachers can create more informed options regarding how to teach, assess, and handle classrooms [12].

The relationship between these two dimensions is critical, and critical thinking is a major reason for students to develop information literacy skills. When teachers model wise information access and intelligent information use, students gain capabilities for academic success in the information age [13].

Studies reveal that the level of information literacy in teachers determines how efficient their teaching is and how well their students learn. Based on the findings outlined here, there are clear implications for including the development of information literacy as part of teacher education and professional training programs [14].

The relationships between information literacy and instructional effectiveness for various educational settings have been investigated more and more in recent years. Collectively, these studies speak to the importance of teachers' digital and information competencies as part of the multifaceted, influential construct in improvement of learning and educational

outcomes.

A broad international research field demonstrates that teachers who possess higher information literacy will feel more capable of embedding technology within their teaching. As an example, research conducted on European schoolteachers shows that pedagogical approaches are more likely to deliver breakthroughs with innovative pedagogy and the employment of interactive digital learning tools when teachers manifest significant digital competence [23].

Similarly, data from Asia also show that information literacy is a significant predictor of teachers' classroom value in the quality of instructional planning and management. Teachers who are good at selecting and using information resources teach lessons in a much more organized manner and offer students a variety of instructional resources [24].

Middle Eastern studies suggest that teachers' levels of information literacy skills are new skills that cannot be attained evenly and are not evenly distributed among teachers. While some teachers have a certain level of proficiency in technological skills, the majority lack the advanced skills not only to evaluate information digitally and contextually but also to apply it to the teaching-learning process [4].

Four substantive trends are identifiable through this integration of empirical studies:

1. There is a positive correlation between teaching effectiveness and information literacy.
2. There was no difference in the available content for different information, but the teachers did vary greatly in how well they assessed and exercised the different information; this was the difference in the quality of the instruction.
3. Conclusion: The role of professional training programs in the development of teacher information literacy skills is crucial.
4. This relation includes institutional support and technological infrastructure, which enable the effective integration of information literacy into the teaching process.

Armed with this knowledge, even though existing studies provide insights into information literacy among postgraduates, they largely target technological skills and fail to consider information literacy as a multidimensional construct. This limitation indicates the need for more studies that examine the interaction effect of access to information, evaluation of information, use of information, and information ethics on quality teaching.

Although digital competence has been researched in relation to teaching quality in earlier studies, there are still relevant research gaps.

For one, most of the available research centers on skills in information technology and does not consider a wider variant of information literacy that would encompass critical evaluation, ethical use, and integration of knowledge. As such, information literacy has not been investigated thoroughly as a quality measure in teaching and learning. Second, few studies have taken into account computer teachers who are at the centre of digital teaching and technology integration in schools. This makes their information literacy competencies especially vital, as computer teachers are expected to play the role of leaders in digital learning environments.

Thirdly, the majority of the prior research has been carried out in developed educational systems, and we do not have sufficient knowledge on the importance of information literacy in enhancing teaching quality in developing educational contexts, particularly in Iraq.

Fourth, sparse studies used advanced statistical techniques, e.g., structural equation modeling (SEM), to capture the interrelations among all information literacy dimensions and educational quality indicators.

Thus, the present study attempts to fill these gaps in the literature by investigating the information literacy of computer teachers in public secondary schools in Baghdad, and provides an analysis of its effect on the quality of the educational software process in six schools, using advanced quantitative methods of analysis.

Hence, this study adds to the existing literature by reporting findings from an under-researched educational setting while also providing suggestions that could be useful for educational policymakers, teacher education programmes, and curriculum development projects.

3. THEORETICAL AND CONCEPTUAL FRAMEWORK

Two primary educational and cognitive theories provide the theoretical basis of this study, including how individuals engage with information and develop knowledge in learning contexts. Accordingly, these theories help create the conceptual base for understanding how teachers' information literacy competencies can indirectly shape the quality of the educational process [15].

Constructivist learning theory and information processing theory form the foundation of this study, as both theoretical frameworks define the process of acquiring, processing, and utilizing information in a learning environment [16].

Constructivist learning theory is one of the most important research paradigms in modern educational theory. The theory suggests that knowledge is not given from teacher to student but is instead built by active learners who interact with information, experiences, and the world around them [17].

According to constructivist views, active learning, inquiry-based learning, and collaborative construction of knowledge should take precedence. This is a system where the teacher no longer stands as a knowledge pourer or machine but as a guide who leads students through a sea of information so they can construct knowledge themselves [18].

Constructivist mediated learning environments lie at the core of information literacy. Strong information literacy skills enable teachers to create learning activities that promote student information seeking, source evaluation, and knowledge building. Hence, this process helps to improve student analytical skills and also ensures deeper cognitive involvement [19].

Constructivist classrooms employ varied sources of information—such as digital databases, internet-based learning platforms, and multimedia resources—to facilitate experiential learning and critical thinking. As a result, accessibility and evaluation of information are the factors that influence the effectiveness of instruction more than anything else in the hands of teachers [22].

Additionally, constructivism emphasizes the need for real-world experiences, where students work on real problems that require them to apply knowledge to authentic situations. Highly information-literate teachers are able to choose appropriate resources and create authentic learning activities that are grounded in reality [23].

Thus, constructivist learning theory can provide a strong theoretical basis for explaining how teachers' information literacy competencies can play a role in improving the quality of the educational process [21].

Information processing theory is a cognitive approach to understanding how the human mind works in the broadest sense of dealing with how human beings acquire, process, store, and retrieve information. This concept describes a process with stages of learning from sensory memory through working memory to long-term memory [20].

In educational contexts, the integration processes discussed are heavily mediated by teachers, who structure information to help students conceptualize and remember the material. Teachers with sound information literacy are more likely to identify appropriate information, organize instructional materials, and present information in ways that promote student thinking [24].

With its origins in cognitive psychology, information processing theory also focuses on attention, perception, and memory during learning. Thus, in order to allow students to learn in a practical manner, teachers need to create instructional materials that are engaging and expose students to information in an organized manner that will help them comprehend it [25].

With students being bombarded with information from every direction in the digital age, it is vital that teachers know how to assess and discriminate information. With information literacy, teachers can distinguish between appropriate and inappropriate sources, thus imparting the correct knowledge to students [27].

In addition, the theory advises that proper teaching techniques should minimize the load on working memory and, instead, structure information in a logical way and present it in bite-sized pieces. Well-developed information literacy skills empower teachers to sift through information and organize learning resources in a manner that adheres to cognitive learning processes [26].

Therefore, information processing theory offers a cognitive perspective on how teachers internalizing information literacy expertise can operate to increase clarity of instruction, retention of knowledge, and ultimately increase the quality of instruction [29].

Therefore, the final conceptual framework of this study, drawn from the results and literature review, is based on the assumption that teachers' information literacy competencies have a major impact on the quality of the educational process. The framework defines information literacy as a multidimensional construct that comprises four fundamental dimensions [6]:

1. Information Access
2. Assessment of Information
3. Information Usage
4. Use of Information in an Ethical and Legal Manner

Together, these dimensions indicate what it means for teachers to engage with information resources as learners in a digital learning space [33]. For the purpose of the above conceptual framework in the current study, information literacy is regarded as the independent variable, and the quality of the educational process is the dependent variable [31].

Three main indicators are adopted to measure the quality of the educational process [32]:

1. Instructional Planning
2. Teaching Effectiveness
3. Student Engagement

The pedagogical framework assumes that teachers with advanced information literacy are better equipped to incorporate digital resources into their teaching practices; they create balanced lessons and motivate interactive learning environments that engage students [30]. Consequently, improvements in teachers' information literacy competencies are expected to lead to significant improvements in the overall quality of the educational process [28].

To ensure clarity in the measurement and analysis of the research variables, each construct in the study was defined conceptually and operationally [7].

3.1. INDEPENDENT VARIABLE: INFORMATION LITERACY

Information literacy refers to the ability of teachers to identify information needs, access relevant information sources, critically evaluate information, and utilize information ethically within educational contexts [8].

Operationally, information literacy is measured through four dimensions (Table 1):

Table 1. *Operational dimensions of information literacy*

Dimension	Operational Definition	Number of Items
Information Access	Ability to locate and retrieve information from digital and academic sources	5
Information Evaluation	Ability to assess credibility, accuracy, and relevance of information	5
Information Usage	Ability to apply information effectively in teaching practices	5
Ethical Information Use	Awareness of copyright, citation, and responsible information use	5
Total items measuring information literacy		20 items

3.2. DEPENDENT VARIABLE: QUALITY OF EDUCATIONAL PROCESS

The quality of the educational process refers to the effectiveness of teaching practices in achieving meaningful learning outcomes and engaging students in the learning process [9].

Operationally, this construct is measured through three indicators (Table 2):

Table 2. *Operational indicators of the quality of the educational process*

Indicator	Operational Definition	Number of Items
Instructional Planning	Ability to design structured and effective lesson plans	4
Teaching Effectiveness	Ability to deliver content clearly and facilitate learning	4
Student Engagement	Ability to involve students actively in learning activities	4
Total items measuring educational quality		12 items

Based on the theoretical foundations and conceptual framework discussed above, the present study proposes a research model that examines the relationship between teachers' information literacy and the quality of the educational process [10].

The proposed model assumes that the four dimensions of information literacy directly influence the quality of teaching and learning processes in secondary schools.

The relationships proposed in the research model can be summarized as follows (Table 3):

Table 3. *Proposed relationships in the research model*

Hypothesis	Relationship
H1	Information Access → Teaching Quality
H2	Information Evaluation → Teaching Quality
H3	Information Usage → Teaching Quality
H4	Ethical Information Use → Teaching Quality

The research model suggests that improvements in teachers' competencies in accessing, evaluating, and utilizing information will lead to significant improvements in instructional effectiveness and student engagement. The proposed model will be tested using structural equation modeling (SEM) to examine the strength and significance of the relationships between the study variables.

4. RESEARCH METHODOLOGY: FIELD WORK / PRACTICAL PART

This study used a quantitative research design, specifically a descriptive–correlational design, to determine the level of information literacy among computer teachers and its reflection on the quality of the educational process in public secondary schools in Baghdad, Iraq.

A descriptive method was used to measure the current state of information literacy, while a correlational strategy was used to examine the relationship between information literacy and educational quality indicators. A cross-sectional survey

design was used, and data were collected during the second semester of the 2024–2025 academic year.

The participants included all computer teachers at public secondary schools in Baghdad, Iraq. Based on the official statistics provided by the Baghdad Directorate of Education (2024), the number of computer teachers was:

$$N = 428 \textit{ teachers}.$$

Stratified random sampling was used based on the following two factors to ensure proportional representation across:

1. Gender (male/female)
2. School location (urban/peripheral districts)

Stratification was utilized to ensure that the sample represented the diversity of computer teachers in Baghdad.

Sample size was determined using Cochran's formula for finite populations, with a 95% confidence level and a 5% margin of error. The sample size at the first stage was ($n_0 = 384$). After adjustment for the finite population, the final adjusted sample size was 203 teachers. In total, 230 questionnaires were sent out to allow for non-response. In total, 211 valid questionnaires were returned. The response rate was 91.7%. The final sample size was 211 teachers, see Tables 4, 5 and 6.

Table 4. *Sample Distribution by Gender*

Gender	Frequency	Percentage
Male	118	55.9%
Female	93	44.1%
Total	211	100%

Table 5. *Sample Distribution by School Location*

School Location	Frequency	Percentage
Urban Districts	156	73.9%
Peripheral Areas	55	26.1%
Total	211	100%

Table 6. *Sample Distribution by Years of Experience*

Years of Experience	Frequency	Percentage
Less than 5 years	41	19.4%
5–10 years	72	34.1%
11–15 years	58	27.5%
More than 15 years	40	19.0%
Total	211	100%

After reviewing existing empirical studies and international frameworks relating to information literacy and learning quality, a questionnaire was structured. The instrument had three major sections:

- Section A: Demographic Information (5 items)
- Section B: Information Literacy Scale (20 items)
- Section C: Educational Quality Scale (18 items)

The total number of items before pilot testing was 43 items.

The structure of the Information Literacy Scale was as follows (Table 7):

Table 7. *Structure of the Information Literacy Scale*

Dimension	Items	Example Focus
Information Access Skills	5	Ability to locate relevant digital resources
Information Evaluation Skills	5	Critical evaluation of online sources
Information Usage Skills	5	Effective integration into teaching
Ethical and Legal Use	5	Awareness of copyright and data ethics
Total	20	

The structure of the Educational Quality Scale was as follows (Table 8):

Table 8. *Structure of the Educational Quality Scale*

Dimension	Items
Instructional Planning	6
Teaching Effectiveness	6
Student Engagement	6
Total	18

A five-point Likert scale was used:

1. 1 = Strongly Disagree
2. 2 = Disagree
3. 3 = Neutral
4. 4 = Agree
5. 5 = Strongly Agree

The mean score interpretation was as follows (Table 9):

Table 9. *Mean Score Interpretation*

Mean Range	Interpretation
1.00–1.80	Very Low
1.81–2.60	Low
2.61–3.40	Moderate
3.41–4.20	High
4.21–5.00	Very High

A pilot study was performed with 35 computer teachers who were not included in the selected sample and who worked in schools outside Baghdad.

The pilot study sought to evaluate clarity, internal consistency, and construct validity.

The reliability results using Cronbach's Alpha were as follows (Table 10):

Table 10. *Reliability Results Using Cronbach's Alpha*

Variable	Cronbach's Alpha
Information Literacy (Overall)	0.92
Information Access	0.87
Information Evaluation	0.89
Information Usage	0.85
Ethical Use	0.83
Educational Quality (Overall)	0.94
Instructional Planning	0.88
Teaching Effectiveness	0.91
Student Engagement	0.86

All reliability coefficients were over 0.80, which indicated excellent internal consistency.

Construct validity was examined through Exploratory Factor Analysis (EFA). The Kaiser–Meyer–Olkin (KMO) value was 0.91. Bartlett's Test of Sphericity was significant at $p < 0.001$. All items had factor loadings between 0.64 and 0.86, demonstrating good construct validity. Two items with loadings of less than 0.50 were removed. The final questionnaire contained 41 items.

The content validity of the questionnaire was examined using a panel of experts ($n = 8$) working in educational technology, curriculum development, and measurement and evaluation from Iraqi universities. Experts were requested to assess clarity of wording, relevance of items, alignment with study variables, and appropriateness of the scale. A Content Validity Ratio (CVR) was calculated based on Lawshe's formula. Content Validity Ratio (CVR) results are given in Table 11.

Table 11. *Content Validity Ratio (CVR) Results*

Scale	Number of Items	Average CVR	Decision
Information Literacy	20	0.86	Accepted
Educational Quality	18	0.88	Accepted
Overall Instrument	38	0.87	Accepted

Content validity was established, as all CVRs exceeded the minimum acceptable value of 0.75 for 8 experts. Expert feedback resulted in minor linguistic adjustments to four items.

Construct validity was established through Exploratory Factor Analysis (EFA), followed by Confirmatory Factor Analysis (CFA).

For Exploratory Factor Analysis (EFA), the KMO Measure of Sampling Adequacy was 0.92. Bartlett's Test of Sphericity was $\chi^2(741) = 3245.67, p < 0.001$. These results suggest that the data are appropriate for factor analysis, see Tables 12 and 13.

Table 12. *Factor Loadings for Information Literacy Scale*

Item Range	Factor Loading Range
Access Skills	0.68–0.84
Evaluation Skills	0.71–0.86
Usage Skills	0.64–0.82
Ethical Use	0.66–0.79

Table 13. *Factor Loadings for Educational Quality Scale*

Dimension	Factor Loading Range
Instructional Planning	0.69–0.85
Teaching Effectiveness	0.72–0.88
Student Engagement	0.67–0.83

All loadings exceeded 0.60, confirming satisfactory construct validity.

The CFA model fit indices were as follows (Table 14):

Table 14. *Confirmatory Factor Analysis Model Fit Indices*

Fit Index	Value	Acceptable Threshold
χ^2/df	2.31	< 3
CFI	0.94	≥ 0.90
TLI	0.93	≥ 0.90
RMSEA	0.056	≤ 0.08
SRMR	0.047	≤ 0.08

The model demonstrated good fit to the data.

Reliability was examined using Cronbach's Alpha and Composite Reliability (CR), see Table 15.

Table 15. *Reliability Coefficients for Main Variables*

Variable	Cronbach's Alpha	Composite Reliability
Information Literacy (Overall)	0.93	0.94
Access Skills	0.87	0.88
Evaluation Skills	0.89	0.90
Usage Skills	0.85	0.86
Ethical Use	0.84	0.85
Educational Quality (Overall)	0.95	0.96
Instructional Planning	0.88	0.89
Teaching Effectiveness	0.91	0.92
Student Engagement	0.86	0.87

All reliability values exceeded 0.80, indicating excellent internal consistency.

Data collection was conducted from March to April 2025. The Baghdad Directorate of Education provided official guidance. Schools were contacted to help in the distribution. A total of 230 questionnaires were distributed manually. Teachers were informed of the study aim and were given 10–15 minutes to complete the survey.

Out of 230 distributed questionnaires:

1. 215 were returned

2. 4 were incomplete

3. 211 valid questionnaires were included in the analysis

The data were coded and entered into SPSS version 27 and AMOS version 24.
The research followed ethical guidelines for research:

1. Voluntary participation

2. Informed consent forms were signed by participants

3. Personal identifiers were not obtained

4. The data were used exclusively for academic purposes

5. Participants had the right to withdraw at any point

Data confidentiality and anonymity were stringently preserved.
Descriptive statistics were used to determine the mean, standard deviation, and level of variables, see Table 16.

Table 16. *Descriptive Statistics of Main Variables*

Variable	Mean	Std. Deviation	Level
Information Literacy	3.78	0.54	High
Educational Quality	3.92	0.49	High

The study found that computer teachers have a high level of information literacy ($M = 3.78$). Educational quality is also at a high level ($M = 3.92$).

Pearson correlation analysis was performed to analyze the relationship between variables, see Table 17.

Table 17. *Correlation Matrix of Main Variables*

Variable	Information Literacy	Educational Quality
Information Literacy	1	
Educational Quality	0.67**	1

$^{**}p < 0.01$

This is also a positive correlation ($r = 0.67$), which means that when information literacy begins to grow, the quality of education will also grow.

A simple linear regression analysis was performed, see Table 18.

Table 18. *Regression Results*

Variable	Beta	t-value	Sig.
Information Literacy $\rightarrow$ Educational Quality	0.65	12.84	0.000

$R^2 = 0.42$, $F = 164.86$, $p < 0.001$.

The standardized β for the role of information literacy shows that 42% of the variance in educational quality can be explained by it.

The structural model results were as follows: path coefficient = 0.68, CR = 13.02, $p < 0.001$. The structural model indicates that information literacy has a positive and significant impact on the quality of education.

5. RESULTS (PRACTICAL FINDINGS)

This yielded a total of 211 valid questionnaires for analysis, reliably reflecting the demographic group of computer teachers in Baghdad public secondary schools (Table 19).

Table 19. *Demographic Characteristics of Respondents ($N = 211$)*

Variable	Category	Frequency	Percentage
Gender	Male	118	55.9%
	Female	93	44.1%
Age	25–34	52	24.6%
	35–44	81	38.4%
	45–54	56	26.5%
	55+	22	10.5%
Experience	< 5 years	41	19.4%
	5–10 years	72	34.1%
	11–15 years	58	27.5%
	> 15 years	40	19.0%
Qualification	Bachelor's	167	79.1%
	Master's	44	20.9%

Mid-career teachers, with 5–10 years of experience, make up the bulk of the sample, allowing for some level of professional experience with digital teaching environments.

The level of each dimension of information literacy was asserted by descriptive statistics, see Table 20.

Table 20. *Descriptive Statistics of Information Literacy Dimensions*

Dimension	Mean	Std. Deviation	Level	Rank
Information Access Skills	3.91	0.58	High	2
Information Evaluation Skills	3.74	0.61	High	4
Information Usage Skills	3.85	0.55	High	3
Ethical and Legal Use	4.02	0.52	High	1
Overall Information Literacy	3.88	0.54	High	—

The grand mean of information literacy was 3.88, which is considered high. The dimension with the highest mean response was ethical and legal use ($M = 4.02$), indicating that teachers are cognizant of the ethical and legal use of information. The lowest-ranked dimension was evaluation skills ($M = 3.74$), which may show a need for further professional development in the critical assessment of digital sources, see Table 21.

Table 21. *Descriptive Statistics of Educational Quality Dimensions*

Dimension	Mean	Std. Deviation	Level	Rank
Instructional Planning	3.89	0.50	High	2
Teaching Effectiveness	4.01	0.47	High	1
Student Engagement	3.86	0.53	High	3
Overall Educational Quality	3.92	0.49	High	—

The total score for educational quality ($M = 3.92$) suggests that computer teachers received good ratings for teaching quality. Teaching effectiveness scored the highest ($M = 4.01$), showing confidence in teaching lessons that build on each other throughout the day and incorporate technology. Conversely, student engagement was rated slightly lower ($M = 3.86$), indicating some variability in the use of interactive teaching strategies and learner-centered practices.

A Pearson correlation analysis was conducted to assess the relationship between information literacy (IL) and teaching quality (TQ), as well as their individual respective dimensions, see Table 22.

Table 22. *Correlation Matrix between Information Literacy Dimensions and Teaching Quality*

Variable	1	2	3	4	5
1. Information Access	1				
2. Information Evaluation	0.63**	1			
3. Information Usage	0.68**	0.71**	1		
4. Ethical Use	0.59**	0.65**	0.62**	1	
5. Teaching Quality	0.58**	0.61**	0.69**	0.55**	1

$^{**}p < 0.01$

The findings show a positive and significant correlation between all dimensions of information literacy and teaching quality. The strongest correlation was found between information usage skills and teaching quality ($r = 0.69$), whose impact on learning outcomes is largely through the effective use of information in education. The descriptive correlation of information literacy with teaching quality was $r = 0.67$, $p < 0.001$. This suggests a large and important effect.

The study was designed to evaluate the main hypothesis: H1: Information literacy has a positive effect on teaching quality.

Additionally, four sub-hypotheses were examined:

H1a: Information access skills have a positive role in teaching quality.

H1b: Information evaluation skills have a positive influence on teaching quality.

H1c: Information usage skills positively influence teaching quality.

H1d: Ethical and legal use has a positive influence on teaching quality.

Multiple regression analysis was conducted (Table 23).

Table 23. *Multiple Regression Results*

Predictor	Beta	t-value	Sig.	Result
Information Access	0.21	3.87	0.000	Supported
Information Evaluation	0.24	4.12	0.000	Supported
Information Usage	0.36	6.45	0.000	Supported
Ethical Use	0.18	3.21	0.002	Supported

Model Statistics: $R^2 = 0.48$, Adjusted $R^2 = 0.47$, $F(4, 206) = 47.86$, $p < 0.001$.

This model accounts for 48% of the variance in teaching quality. Information usage was the most significant predictor ($\beta = 0.36$), accentuating the imperative of contextually orientating digital competence towards practical pedagogy.

In order to further substantiate the causal relationships, Structural Equation Modeling was performed using AMOS.

The structural model results were as follows: Path Coefficient IL $\rightarrow$ TQ = 0.71, Critical Ratio (CR) = 13.84, $p < 0.001$, R^2 (Teaching Quality) = 0.50. Thus, this means that, in the structural model, information literacy accounts for 50 percent of the variance explained in teaching quality, see Table 24.

Table 24. *SEM Model Fit Indices*

Fit Index	Value	Threshold	Evaluation
χ^2/df	2.18	< 3	Good
CFI	0.95	≥ 0.90	Excellent
TLI	0.94	≥ 0.90	Excellent
RMSEA	0.053	≤ 0.08	Good
SRMR	0.044	≤ 0.08	Good

The hypothesized relationship seems to be rather strong, as reflected in a well-fitting model. The structural coefficient of 0.71 indicates that information literacy is an important determinant of teaching quality. The scale of this implication indicates that, with respect to technology-mediated teaching-learning practices, information literacy acts as a primary pedagogical competence instead of a secondary one.

Considering that explained variance in educational research is often only 20% to 40%, the relatively large R^2 value of 0.50 is also noteworthy. From a practical perspective, this indicates a large effect size.

The main empirical findings of the study are as follows:

1. The level of information literacy ($M = 3.88$) of computer teachers in Baghdad is high.

2. Teaching quality ($M = 3.92$) indicators are also positive.

3. Teaching quality has a very high positive correlation with information literacy ($r = 0.67$).

4. Multiple regression analysis indicates that all four dimensions are statistically significant predictors of teaching quality.

5. Structural Equation Modeling with all fit indices validates the conceptual model.

6. Information usage skills are the best predictor of teaching success.

7. Information literacy accounts for between 48% and 50% of variance in teaching quality, representing important practical significance.

The findings highlight IL as a key strategic change agent and not just another digital competence in the curriculum. Results align with the idea that pedagogical innovation at the secondary level requires higher-level cognitive and evaluative digital competencies of teachers.

6. DISCUSSION

The results revealed that information literacy among computer teachers in public secondary schools in Baghdad is high ($M = 3.88$), and the level of overall teaching quality was also high ($M = 3.92$). The very high positive correlation between information literacy and teaching quality ($r = 0.67$) implies that the teaching effectiveness of digitally literate teachers has a very strong impact on the effectiveness of instructional implementation by teachers.

The regression and SEM analyses revealed that the strongest predictor of teaching quality is information usage skills, followed by evaluation skills, access skills, and ethical awareness. Access to information combined with real-world application and investigation of that information can be far more effective in fostering positive teaching outcomes.

These results certainly support the theory that digital literacy is a pedagogical necessity, not just a technological skill. Its high predictive power ($R^2 = 0.50$), leading to half of the variance in the quality of teaching being explained by teacher information literacy, represents a significant finding in educational research.

These results agree with international studies, as shown in Table 25.

Table 25. *Comparison with Previous Studies*

Study	Main Findings	Alignment with Current Study
McGarr & McDonagh [2]	Teacher digital literacy positively impacts student engagement	Supports correlation between information usage and teaching quality
Al-Emran et al. [3]	Evaluation skills are crucial for effective digital pedagogy	Confirms importance of evaluation skills as a predictor
Farah et al. [35]	Ethical awareness enhances instructional planning and credibility	Supports ethical use findings

Such comparisons show that the present findings are in line with global evidence about digital competencies playing a role in the quality of teaching.

The theoretical contribution of the study is made by combining information literacy frameworks with an educational quality model. Information literacy is a multidimensional construct that affects both the practice of teachers and the performance of students. Evaluation and usage skills are the most powerful dimensions, indicating engagement in higher-order cognitive functions. Although less predictive in nature, ethical and legal awareness provides stability and support for trust and compliance in technology-mediated instructional experiences.

This theoretical synthesis provides additional rationale for incorporating information literacy into teacher competency models.

The practical and educational implications of the study are also important. For teacher training, information usage and evaluation skills should be emphasized in professional development. Workshops can bridge gaps in critical thinking and digital content evaluation. Scenario-based learning should be used to model the real application of information literacy in the classroom.

Recommended training focus areas are presented in Table 26.

Table 26. *Recommended Training Focus Areas*

Skill Area	Training Approach	Expected Outcome
Information Evaluation	Critical thinking workshops	Improved source assessment
Information Usage	Classroom simulation exercises	Enhanced lesson integration
Ethical Awareness	Case studies on copyright & digital ethics	Responsible information handling
Access Skills	Online database navigation sessions	Efficient resource retrieval

Governments could link digital literacy standards for teachers with performance measurement systems through Ministry of Education collaboration. Continuous access to digital resources and teacher collaboration should be provided by schools. National curriculum frameworks must acknowledge information literacy as a fundamental competency.

Curriculum developers should include activities that develop skills in information assessment and responsible use. Digital tasks support the actual practice of applying information to the teaching process. Assessment strategies should assess both the technical and cognitive dimensions of information literacy.

Limitations and mitigation strategies are presented in Table 27.

Table 27. *Limitations and Mitigation Strategies*

Limitation	Description	Mitigation / Consideration
Sample Location	Conducted only in Baghdad	Future studies could expand to other regions
Self-Reported Data	Potential bias in questionnaire responses	Pilot testing and reliability analysis minimized this risk
Cross-Sectional Design	Cannot infer causality	SEM provided structural validation, but longitudinal research is recommended
Resource Constraints	Limited access to some schools	Coordinated with education directorate to maximize coverage

While these limitations apply, the powerful statistical results, high response rate of 91.7%, and consistency with global literature make the study generalizable and give it considerable strength in similar educational settings.

7. CONCLUSION

The results show that the levels of computer teachers' information literacy competencies in Baghdad public secondary schools are high ($M = 3.88$), and their information literacy competencies make a significant contribution to the quality of the educational process ($M = 3.92$).

The key conclusions of the study are as follows:

1. SEM demonstrated that information literacy is a robust correlate of teaching quality, explaining nearly 50% of the variance ($R^2 = 0.50$).
2. Information usage and evaluation skills are the greatest predictors of teaching quality, reminding us that engaging students at a higher-order cognitive level is what matters most.
3. Both ethical awareness and access skills make positive contributions, albeit relatively smaller ones, but act as stabilizing factors around instructional quality.
4. The significant and positive association between digital competencies and teaching effectiveness shows that teacher professional development should be concerned with applied information skills.

These findings reinforce the argument that information literacy is a core pedagogical competence, showing adequate technical knowledge needed for effective teaching in the 21st century.

8. RECOMMENDATIONS FOR PRACTICE AND POLICY

For teachers, several practical recommendations can be drawn from the findings. In the area of information usage, teachers should engage in project-based digital teaching, which is expected to improve lesson integration. In the area of evaluation skills, teachers should conduct regular source assessment exercises, which can enhance critical thinking and content reliability. In relation to ethical awareness, teachers should participate in digital ethics workshops, which can reduce plagiarism and legal risks. In the area of access skills, teachers should receive training in advanced search techniques and database navigation, which can support faster and more efficient resource retrieval.

At the policy level, teacher training should integrate information literacy modules into professional development, for example through mandatory annual workshops. Curriculum policy should include digital information evaluation tasks in lessons, such as assigning digital research projects. Assessment policy should develop evaluation rubrics that include digital competency, including the incorporation of digital literacy into teacher appraisal. Resource allocation should also provide access to online databases and digital libraries by ensuring that all schools have appropriate subscriptions.

The strategic educational implications of the study are as follows:

1. Digital literacy among teachers gives rise to students being able to build on their own skills of engaging in meaningful instruction.
2. Integrating these competencies systematically into national curricula has a greater potential to massively increase innovation and sustainability in education.
3. Digital competencies in evidence-based policy meet international benchmarks.

9. LIMITATIONS OF THE STUDY

The study has several limitations. First, the geographic scope was limited because data were collected only in Baghdad, which means that the findings may not fully generalize to rural areas or other regions. Second, the study relied on self-reported measures, which may involve potential response bias, although this was mitigated through pilot testing and reliability checks. Third, the cross-sectional design involved single-point data collection, which limits causal inferences; therefore, longitudinal studies are recommended. Fourth, the sample size was $N = 211$, which was adequate for SEM, but larger samples could increase the generalizability of the findings. Fifth, resource constraints limited access to some schools, although efforts were made to ensure coverage and representative sampling.

Nonetheless, the strengths of the study design and the results, which are in very good agreement with the international literature, add to the face validity of the findings.

10. SUGGESTIONS FOR FUTURE RESEARCH

Future research should expand to multiple regions in order to examine rural and urban differences and broaden the generalizability of findings. Longitudinal studies are also recommended to track changes in information literacy over time

and examine causality between information literacy and teaching quality. Future studies should include student outcomes by correlating teacher information literacy with student achievement, thereby linking teaching competencies directly to learning outcomes. A mixed-methods approach should also be considered by using qualitative interviews alongside surveys, which would provide deeper insight into instructional practices and barriers. Finally, technology-specific training should be investigated, particularly the impact of emerging tools such as artificial intelligence and virtual reality, in order to update pedagogy for 21st-century classrooms.

To enhance the global applicability of these findings, future research could add a diversity of contexts, longitudinal designs, and measures of direct student outcomes, while also providing guidance for policymakers and practitioners.

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