

## RESEARCH ARTICLE

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# Reflective Practices Among Secondary School Computer Science Teachers: Their Point of View

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## ABSTRACT

Reflective practice is an essential catalyst through which the benefits of teaching and learning can be reaped. Through it, weaknesses and strengths can be identified in a way that helps raise the level of addressing challenges that may arise as well as overcome them. This paper presents the critical reflective practices among computer science secondary school teachers from their point of view in Riyadh, Saudi Arabia. To this extent, the study aims to determine the degree of critical reflective practices among computer science secondary school teachers in Riyadh from their perspective. The paper also seeks to investigate the effects of variables such as gender, qualifications and experience on the perceptions of the aforementioned teachers, towards the critical reflective practices among computer science secondary school teachers. The study tool is a questionnaire which consisted of two dimensions and was distributed to a population of 739 participants. From this, the study sample comprised (223) computer science teachers working in secondary school in Riyadh. The findings revealed that there is no significant difference in the estimation degree concerning the critical reflective practices due to the gender. From the results, it was also established that there is no significant difference in the degree of estimation in relation to the critical reflective practices due to educational qualification variables. On the contrary however, there is a significant difference in the degree of estimation in regard to the critical reflective practices due to the years of experience variable. These differences were evident in a group of those with more than 10 years of experience. The other findings produced by the study highlight that the participants are in agreement about the importance of critical reflective practices. The degree of reflective practice, which is from the participants' point of view, is considered to be of a high value. The majority of the subjects opted to agree with the practice of reflection after a training session. It was determined from the results that some of the most common strategies favored by practitioners involved the communal practice of mind reflection with individuals from outside the school.

**Keywords:** computer science teachers, reflection, reflective practices, views.

## INTRODUCTION

Schools have realized that thinking skills are a focal point of twenty-first century education, and perhaps the most essential of those skills is critical thinking with reflection (Johnson, 2011). To this extent, people are able to act purposefully due to critical thinking, which is a type of mental processes. Likewise, individuals can suppress and prevent the repetition of habitual patterns, stereotypes, biases and assumption through this mental process. Furthermore, the information available is evaluated and judged upon and through this, logic, comparisons and inferences can be used to allow access to specific ideas, theories or behaviors (Altin & Saracaloğlu, 2018). There are several types of thinking, including critical, analytical, creative, and reflective thinking. Of the aforementioned, critical thinking often emanates when there is a discussion on academia. This is a unique characteristic of the human mind which distinguishes it from other creatures. Here, teachers reflect on the situations at hand, analyze them into their elements, and draw the necessary plans to understand these situations, in order to reach the desired results (Halpern et al., 2012).

As a term, 'critical thinking' is ubiquitous in the current pool of literature and it carries numerous variations of how it is defined. For Halpern (1993), critical thinking and higher-order thinking skills are interchangeable in their application.

Additionally, they are valued as a talent for collecting and analyzing information, extracting the main ideas, and drawing conclusions (Halpern, 2001). Contrastingly, Facione (1990) takes a different view of how critical thinking should be understood. The author argues that as a construct, critical thinking is separate from other thinking skills and that not all cognitive skills should be associated with critical thinking, with the exception of interpretation, analysis, evaluation, inference, explanation, as well as the self (Halpern & Butler, 2011).

The concept of reflective practice and its birth are often attributed to the work of the renowned philosopher John

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Dewey, who in 1933, published a book titled 'How We Think'. Therein, he discusses the importance of contemplation in building on developed experience and in actuality, this is the basis for teaching and learning processes. Furthermore, he alludes to the necessity of discovering experiences that lead individuals towards comprehensive awareness which in turn, helps to convert experience into learning. Dewey was an advocate for teachers to practice reflection in social contexts and other environments which cater for learning to occur. Accordingly, analyzing teacher's ideas through their teaching practice is vital as it can encourage variation of practice methods and lead to the desired development in teaching practices (Ward & Gracey, 2006). Within his school of thought, John Dewey alluded to the concept that reflective thinking was a process through which a person comprehended aspects of an experience and could link it to a previous occurrence. This allows the individual to systematically navigate between the aforementioned experiences through deep thinking. He further illustrates that reflective thinking occurs in a society which nurtures interaction based on optimism, especially in difficult situations and this consequently fosters one's personal and intellectual growth (Rodgers, 2002).

Florez (2001) states that reflective thinking is a process which comprises four stages, the first of which involves the collection of data on occurrences inside the classroom. The collected data is then analyzed to cater for planning methods in which the desired activities are determined and any available alternatives are established. The fourth stage requires for the plan to be evaluated, which would then give birth to new perspectives and perceptions for improving teaching practices. In this regard, reflective practitioners should accept that their teaching practices as well as the associated motives, will come into question so that ultimately, teaching can be improved.

The need to improve the recruitment, preparation, qualification and development of teachers was prioritized as one of the strategic objectives set out by the National Transformation Program, an economic action plan which is part of the Kingdom's Vision 2030 (Jawdah, 2019). Due to these developments, reflective practice takes centre stage as the most appropriate gateway to professional development and staff preparation, in contrast to traditional preparation models (Keshik, 2019).

Given the above, the connection between reflection and critical thinking can be understood. When teachers are able to reflect on their practice, they can implement more effective practices of better quality because they are able to make informed decisions based on their experience (Reagan, 1993). According to Loughran (1996), reflection works best in unorthodox situations and through this process, the learner is given vital support and better able to grasp the information being received. In addition to this, reflection as a process equips the teacher with the ability to guide and direct learning in

the most appropriate method of delivery. Reflective thinking enables people to analyze prior knowledge and construct new concepts based on experiences and this ultimately aids the professional development of that teacher (Finlay, 2008). The parallelism between reflection and meta-cognitive thinking grants us the cognitive structure we need to be able to explain how people can alter their decisions and actions based on their goals (McAlpine, Weston, Berthiaume, Fairbank-Roch & Owen, 2004).

For students to acquire the necessary skills in reasoning, their teachers need to be able to teach and model reflective practice. Likewise, teachers themselves need to have learned reflective practice during their initial education and training, and would have continued developing their reflective skills throughout their careers. In actuality, many new teachers lack the knowledge and experience of how to transfer the thinking strategies they learned in college to classroom teaching. Students are often asked to 'think' without teaching them how to do so, or without teaching them the possibility of different types of thinking. In some cases, a clear definition or rationale for critical reflective practice is not afforded to the learners. A study by Alessio & Charles (2019) focused on one of the most important ways to develop and prepare teachers in various fields, which is to initiate reflective practices. This is because such practices put the self-development of teachers and educators to the test by evaluating their teaching practices. In turn, this enables teachers to raise their level of self-awareness and develop their professional growth, as they analyze their contemplative practices. In other words, teachers can evaluate their own practice through observations, criticism, logical analysis, and their openness to those around them. Choy et al., (2019) are also of the opinion that practicing the process of reflection in the classroom often equips teachers with the ability to solve classroom problems on their own and makes them more aware of the beliefs and values they have towards the teaching process. This leads to the teachers being more involved in curriculum development and allows for more interaction with the processes of change within the school (Qhoos, 2017). Furthermore, teachers are able to take responsibility for their professional development and meet the educational and behavioral needs of their students through constantly practicing the process of reviewing their goals, teaching methods and educational tools (Qhoos, 2017).

## AIM OF THE STUDY

Given the aforementioned, the current study explores the extent to which Saudi computer science teachers are aware of reflective practices and whether they apply them. The paper also seeks to reveal which strategies are used by the participants as mechanisms for reflection. Additionally, certain variables such as gender, experience and qualifications on teachers'

reflective practices are discussed in relation to their effects on teachers' reflective practices.

The main question of the study can be determined as: **What are the Critical Reflective Practices Among Computer Science Teachers in Riyadh from their Point of View?**

### Research Questions

1. What is the estimation degree of the critical reflective practices by male and female teachers?
2. Are there any statistically significant differences in the estimation degree of the critical reflective practices due to the gender variable?
3. Are there any statistically significant differences in the estimation degree of the critical reflective practices due to the variable years of experience?
4. Are there any statistically significant differences in the estimation degree of the critical reflective practices due to the educational qualification variable?
5. What strategies do teachers use to reflect on their practices?

### OBJECTIVES OF THE STUDY

The study at hand presents a myriad of aims which include determining the degree of the critical reflective practices among computer science secondary school teachers in Riyadh from their point of view. The study also sought to analyze the critical reflective practices among the aforementioned teachers from their perspectives. Similarly, finding an effect of the variables of qualifications and experience on the perceptions of the participants was also among the study's objectives. For the final objective, the study was designed to determine strategies used by computer science secondary school teachers in Riyadh to reflect on their practice.

### DEFINITION OF TERMS

#### Reflective Practice

Reflective practice is defined as a continuous learning process used as an imperative tool by students and educators to ensure the success of learning and development. In this process, individuals can recall their actions as a source of personal development and betterment. Reflective practice is built on the principle that 'experience' alone does not always guarantee learning, but 'reflection of what one has experienced' results in learning and personal growth (Finlay, 2008).

As part of this research, teachers can use reflective practice techniques to evaluate their actions in an objective manner. They can also analyze emotions, results, experiences of their actions, as well as effectiveness of their exertions. By doing so, plans for improving teaching styles and instructional practices can be made and implemented.

### Critical Practice

Critical practice can be defined as the blueprint used by critics and observers with the aim of understanding and evaluating a given field of knowledge. Applying critical practice serves the goal of developing the ability and skills needed to explore beyond the usual aspects of any given profession. This comprises any unintended effects, causes, and consequences and to do so, one has to approach this from a critical and evaluative perspective (Ahmed, 2020)

In this research, critical practice is defined as the strategy that the teacher uses to understand and evaluate the educational process with the aim of developing the teaching proficiency and exploring beyond the boundaries of goals set for the educational process. As a result, the teachers can approach their practice from a critical and evaluative angle so as to unearth any unintended side effects, causes, and consequences.

### Study Delimitations

In this study, there are a few delimitations which should be acknowledged. That been said, the aforementioned should not affect full appreciation of the merits brought forth by the research. The first delimiting factor is the subject at hand; the current study only focused on reflective practices for computer science secondary school teachers. In other words, the subject could be broader in future studies. Likewise, there were limitations in relation to the location as all aspects of the study were conducted in Riyadh, Saudi Arabia. The sample was also limited to 223 computer science teachers in secondary schools. The last delimitation is the period, which was restricted to the third semester of 2021/22.

### Study Tools

The study tools comprised perimeter sources in the form of books, periodicals, and scientific journals that dealt with the variables of the study in the last ten years. The study's questionnaire represents the second tool; it was designed by the researcher and consisted of two axes.

### REVIEW OF LITERATURE

The nature of learning and teaching commends that as individuals, we need to observe challenges through multiple lenses of different variations, and this is an aspect of reflective practice. It is common belief that activating reflective practice acts as a vital component of sustainable professional development and teacher education. There is a relationship between reflection and development, and reflection leads to rapid development, which in turn fosters improvement of the processes that take place in the classroom and learning outcomes (Qutoshi, 2018). Thus, teachers and learners rely on informed thinking in instances which require

problem-solving, decision-making, and critical thinking processes.

In the twenty-first century, learning and teaching at school have been affected by globalization and the technological revolution. This is in addition to what has emerged from digital technologies and the ongoing development of flexible learning spaces. These developments purport to maximize reflective practice by educators and this is based on Benade (2015) who illustrated a project in which several New Zealand case studies were used to engage educators and leaders in interviews to explore their experiences of the future-digital-reflective convergence. This highlighted theoretical and critical explanatory approaches, and the data shows the relationships between reflective practice and learning in the twenty-first century. The relationships emerged as a result of analyzing and comparing educational theoretical discourses produced by a group of former principals and leaders on the one hand, and teachers on the other hand.

Baljoun and Kawther (2010) fractionate the processes of reflective practice into three fundamental phases, the first of which is referred to as a descriptive process. This approach requires individuals to describe and analyze reality using critical thinking skills. The next stage would involve the process of conjuring up a plan for implementing change and this ultimately leads to the final stage, which is to improve the outcome of similar situations in the future. Similarly, another aspect of the final stage is that benefits can be extracted from any new situations that arise.

One of the gems of practicing reflection in teaching and learning can be found in encouraging the practitioner to view challenges from multiple perspectives. Reflective practice can have positive influence on how teacher education is designed and how professional development can be made truly sustainable. To this extent, conscious reflection is a vital catalyst for supporting teaching and learners in problem-solving and decision-making processes, as well as nurturing critical thinking abilities. A study by Abdulwali et al., (2017) investigated teachers' perceptions regarding their experiences with reflective practices and reflective teaching. A three-dimensional questionnaire was the main tool for data collection and it was distributed to 458 (237 male and 221 female) science teachers working at high schools in Saudi Arabia. The results indicated that teacher practices were at a high level from the participants point of view and this holds true for nearly all reflective activities covered in the three dimensions. This included aspects such as the extent and area of practicing reflection, as well as ways of engaging in such practice. In relation to the gender and experiences in the teaching profession, the results revealed that no significant differences in the teachers' perceptions of their practices of reflective activities could be confirmed.

Critical reflective practices lead to a change in teachers' teaching style, which ultimately leads to better performance through clarification and observation. In addition, this allows for the analysis of the convictions and beliefs that teachers hold about their professional roles and responsibilities. Thus, it can be concluded that reflection provides a basis for the growth of individuals intellectually and professionally. This requires teachers and researchers to provide everything related to the nature of thinking and learning (Schoonard et al., 2020).

The teachers' critical reflective practices reinforce the beliefs of their teaching selves, which consequently reflects positively on the teachers' sense of their ability to achieve the desired learning goals and bolsters their confidence in the methods used in teaching. Additionally, such practices also highlight the degree of their effectiveness associated with the achievements of their students, as well as affect teachers' attitudes toward their teaching behavior while raising awareness of their difficult roles (Tshering et al., 2022).

Regarding the role of critical reflective practices in developing the level of awareness of practices, the process of contemplation enhances the role of the researcher in critical reflective practices. To this extent, the teacher's sense of doubt or dissatisfaction is aroused and all actions thereafter are fully examined. In such cases, the practitioner plays the role of the researcher, as he begins to collect information and data, focusing on his personal behavior within the professional context (Aldahmash, 2020).

Furthermore, practitioners simultaneously take the role of the critic who monitors and follows his/her actions so that he/she stands away from the experience itself. By doing so, the teacher can observe the practice through the lenses of a critic and thus plan for an intervention if necessary. Critical reflective practices are a powerful force for educational change and an effective approach to professional development (Nazir et al., 2022). This is because critical reflective practice is an integrated way of thinking and doing.

In education, significant focus is placed on learning and behavior. In addition, reflective practice culminates in greater levels of self-awareness about the nature and impact of one's performance. Therefore, by obtaining such awareness, prospects of professional growth and development can be realized (Decker et al., 2021). There are many studies that have proven the role of critical reflective practices and their impact on the professional development of teachers, as well as achieving unlimited professional growth. The growing trends in education have drawn the attention of educators to the interest in constructivist theory in learning. The premise states that the learner builds knowledge through the processes of interaction and integration with the educational content and the surrounding environment. Therefore, these trends came to be at the forefront of the factors that contributed to the emergence of the idea of critical reflective practices in the educational field.



Research conducted by Scott and Issa (2008) sought to identify the relationship between reflection practices implemented by teachers, student satisfaction and learning outcomes. The data was collected from (45) students using a questionnaire, interviews and blogs. The findings confirmed a positive relationship between reflective practices, students' performance and the rate of their responses. The results also highlighted a gradual increase in the development of cognitive challenges and the development of assessment skill.

In their study, Ogonor and Badmus (2006) aimed to investigate the effect of reflective teaching on the beliefs of student teachers concerning their future roles. A questionnaire was favored as the data collection tool from a sample of 304 final year students at Teachers College in Nigeria. The results also confirmed that there is an effect of teachers' beliefs about reflective practice on their current and previous knowledge in education, their professional growth, their previous experiences, and their pursuit of achieving excellence.

A separate study conducted by Abu Askar and colleagues (2017) sought to identify the level of appreciation of science teachers for their reflective practices in the northern Gaza governorate from their perceptions. The authors chose to use the analytical descriptive approach and a questionnaire was filled out by 131 male and female participating teachers. Upon completion, one of the stand-out results was that the reflective practices of science teachers were at a moderate level.

Minott (2009) conducted a qualitative study which included observing the practices, interviews, and documentation analysis of four teachers. The author also sought to identify the extent to which the participants used the principles of reflective teaching in implementing the teaching steps. The results indicated that three of the four teachers were more reflective in their teaching practices. This is because they used the principles of reflective teaching in most of the teaching steps and activities. Additionally, the findings demonstrated that the application of reflective practices positively affects the teaching contexts and situations.

In another study, AlRashidi (2018) focused on estimating the level of reflective practices among secondary school teachers in Buraidah city in Saudi Arabia from their perspectives. The author opted for a descriptive approach using the reflective practices scale on a sample of 257 male and female secondary school teachers. The results showed that the level of use of reflective practices by the research sample was moderate. Moreover, it was established that there were no statistically significant differences in the level of use of reflective practices by the research sample due to the variables of gender and specialization.

A model of in-service teacher training which serves to develop teachers' abilities to practice and implement reflective processes in teaching was suggested by Schön, a renowned researcher and academic. It has been observed

that teachers face difficulties when trying to implement and practice everything they have learnt due to the complex nature of teaching. This problem is further compounded if no planning was done because teachers are expected to think, analyze, and reflect on every detail of their teaching process. In the realm of practice, teaching is not limited to being a set of abilities and expertise acquired by the practitioner, but it is also the manifestation of the thinking process, the formation of ideas and notions of what occurs in the classroom (Schön, 1984).

Ostaz (2011) investigated science teachers' abilities in practicing reflective thinking to solve educational challenges they encounter while teaching at the primary level in Gaza. Furthermore, they sought to determine the effects of certain variables such as gender, experience, academic qualifications, as well as the type of institution i.e., public schools, UNRWA schools, in relation to reflective thinking. The research comprised 108 participants and the researcher gathered data using a reflective thinking scale. The scale included a total of nine issues which science teachers could possibly face while engaged in their daily practices. The results from the study pointed to the fact that practitioners are yet to reach satisfactory levels of mastery for reflective thinking. In fact, the levels were below 70%, which fails to meet the current expectations. Furthermore, significant differences were noticed in favor of experienced teachers for the experience variable.

In a study by Shaheen (2012), the levels of reflective practices in faculty members employed at Al-Quds Open University and the link to their attitudes toward professional self-development were investigated. The findings, from 117 participating faculty members, demonstrated that the practitioners had achieved mastery of reflective practices beyond satisfactory. It was also noted that there were no statistically significant differences found concerning academic qualifications, the college, or the years of experience. That been said, the results revealed significant relationships between the participants' attitudes toward professional development and their reflective practices.

## METHODOLOGY

### Study Approach

In order to achieve the objectives of the study, a descriptive method was used, which can be defined as a specialized descriptive approach to data and facts collection, compilation and tabulation. This is in addition to analyzing the exact depth of adequate analysis; it also includes a degree of interpretation of these results and therefore, it is used as a measurement approach. Classification and interpretation methods are also utilized in order to extract significant conclusions, and thus extract meaningful conclusions.

## Sample and Sampling

The study population is comprised of computer science secondary school teachers in Riyadh, Saudi Arabia. The entire population number is 739 male and female participants and from this, a random sample of (223) computer science secondary school teachers was selected. (48.5%) of the participants were males and (51.5%) of them were females. (38.8%) of the participants had more than 10 years of experience, while (33.2%) of them had anything between five to 10 years' worth of experience. However, (28%) of the participants had less than 5 years. As for qualifications, (58%) of the participants were holders of bachelor's degrees, and (30.2%) had obtained Master's degrees. Those with PhD degrees made up (11.7%) of the participating population.

## Research Tool

The research tool used is the questionnaire in order to achieve the objectives of the study and answer its questions

The questionnaire contains a set of items, which support the research topic through its direct relationship with the research objectives and questions.

## Description of the Research Tool (Questionnaire)

The questionnaire contained two main parts:

- **The first part** consists of demographic data on the research sample.

- **The second part** consists of the axes of the questionnaire, consisting of (2) main axes which serve the objective of the study.

To collect the answers to the questionnaire, a three-point Likert scale was used with degrees for one (disagree), two (neutral) and three (agree). Participants were asked to rate the extent to which they agreed or disagreed with each statement.

## Internal Consistency

The researcher calculated the internal consistency by calculating the Pearson correlation coefficient between each phrase and axis that it belonged to as shown in the table below:

From Table (1), the researcher concludes that all Pearson correlation coefficients between each phrase and the axis that it belonged to, come with a high degree and are significant at (0.01). This indicates a high degree of validity of the internal consistency of the axes' items.

## Reliability of Questionnaire

To ensure of the reliability of questionnaire, the researcher used Cronbach's Alpha test as shown in the following table

From Table (2), the researcher concludes that the reliability coefficient values of the questionnaire axes were all of high scores and the total score of reliability was (0.822), which is a positive indication. It refers to the validity of the questionnaire for the application and the reliability of its results.

**Table 1:** Pearson correlation coefficient between each phrase and axis

The estimation degree of the critical reflective practices of male and female teachers		Strategies used by teachers to reflect on their practice	
<i>N</i>	<i>Correlation Coefficient</i>	<i>N</i>	<i>Correlation Coefficient</i>
1	.897**	1	.559**
2	.799**	2	.681**
3	.786**	3	.743**
4	.618**	4	.831**
5	.704**	5	.662**
6	.611**	6	.701**
7	.804**	7	.699**
		8	.742**

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 2:** Cronbach's Alpha Coefficients

<i>Axis</i>	<i>Cronbach's Alpha</i>	<i>N of Items</i>
The estimation degree of the critical reflective practices by male and female teachers.	.863	7
Which strategies do teachers use to reflect on their practice?	.806	8
Total Score	.822	15

## Ethical Considerations

The study at hand was guided by ethical principles which were formulated on informed consent, confidentiality, voluntary participation and anonymity. Thus, the consent of all participants was obtained before any aspects of the research were initiated. This was done through an email which clarified every detail of the study, including the aims and how the data would be used. When completing the consent form which was communicated as an online survey, the participants were assured of their anonymity. Likewise, the participants provided their signatures and acknowledged that they always reserved the right to withdraw at any point. The researcher can confirm that all protocols were observed which therefore ensured strict adherence to the above-stated ethical principles.

## Statistical Method

For the research and its goals, the researcher used the (SPSS) program by analyzing frequencies, percentages, means, standard deviations, Person correlations, Cronbach's Alpha, and equation of the range as follows: ((1: 1.66) Disagree, (1.67: 2.33) Neutral, (2.34: 3.0) Agree)

## RESULTS AND DISCUSSION

### The estimation degree of the critical reflective practices of male and female teachers

To study the estimation degree of the critical reflective practices of male and female teachers, the researcher used the mean, standard deviation and the rank for each phrase as follows:

From Table (3), the researcher concludes that the estimation degree of the critical reflective practices of male and female teachers was represented by the (agree) option, with a mean of (2.54) and the standard deviation as (0.72), which is considered to be a low value. Thus, there is clear similarity between the opinions of the participants regarding this axis and because all the items on the survey had low values of standard deviation, this also shows the uniformity of the participants' opinions on those items.

The results in Table (3) represent the degree of reflective practices among secondary school computer science teachers in Riyadh. The degree of reflective practice, which is from the participants' point of view, is considered to be of a high value and from the results, 'practicing reflection after attending a training session' was the most important. It was ranked first and had a mean average of (2.70) out of 3. With a mean average of (2.69), the statement which declared that 'reflection practice after a visit from the supervisor or school principal' was ranked second. 'Reflection practice after the end of teaching a unit' was ranked third and (2.65) was the average mean. The fourth position was represented by 'reflection practice after the end of the lesson', which had a mean of (2.49). Thus, these findings are consistent with a similar study conducted by Ferraro (2000), which highlighted the high levels of habitual teacher reflection on their experiences. It was also shown that such practices result in progress toward techniques of effective development. Similarly, a study by Obaidat (2017) produced comparable results which support those of this current study. Therein, the high rates of reflective practice levels by primary school teachers were evident. The consistency in the findings also applies to the results in studies by Rayyan (2014) and Shaheen (2012). The former indicated high levels of reflective practice among mathematics practitioners, whereas the latter research asserts that from their point of view, the participating faculty members had high levels of reflective practices. The findings of this study are in contrast to the work of Farwana (2006), which demonstrated that the participating teachers had low levels of knowledge in regard to reflective practices.

### To determine the possibility of any statistically significant differences in the estimation degree of the critical reflective practices due to the gender variable, the researcher used the independent sample t-test.

From Table (4), there is no significant difference in the estimation degree of the critical reflective practices due to the gender variable, where (sig = 0.612). This result was more than (0.05) and this agreed with findings by Abdulwali et al., (2017),

**Table 3:** The Means and Standard Deviation for the First Axis

No	Phrase	Mean	Std. Deviation	Rank
1	Practicing reflection after attending a training session.	2.70	.871	1
2	Reflection practice after a visit from the supervisor or school principal	2.69	.719	2
3	Practice reflection while writing the lesson plan	2.48	.469	5
4	Reflection practice during the lesson	2.41	.532	6
5	Reflection practice after the end of teaching a unit	2.65	.845	3
6	Reflection practice after the end of the lesson	2.49	.931	4
7	Reflection practice after meeting parents	2.39	.682	7
General mean		2.54	0.72	

Efe (2009), Ostaz (2011) and Rayan (2013). in their studies, the results showed that there are no significant differences in the teachers' views about their reflective practices in relation to their gender. When compared to the outcomes of research conducted by Abu Sultan and colleagues, (2017), it is explicitly clear that the results of this study oppose their findings. The aforementioned team of researchers produced a study in which there were no significant differences due to the variables of experience gained and academic qualifications. However, that study also produced findings which highlighted the statistically significant differences due to the variable of gender and this was in favor of the female participants.

**To establish whether there were any statistically significant differences in the estimation degree of the critical reflective practices due to the years of experience variable, the researcher used the One-Way Anova -test.**

From Table (5), there is a significant difference in the estimation degree of the critical reflective practices due to the years of experience variable. Here, the result showed ( $\text{sig} = 0.00$ ), which is less than (0.05), and these differences were attributed to the group in which the participants had more than 10 years of experience. The results contradict findings by Rayan (2013) in which it was confirmed that there was slight significance in the level of reflective teaching practices and this favored teachers with less experience.

These results also oppose the findings in a study by Abdulwali and colleagues (2017). In their research, the results showed that there are no significant differences in the teachers' views about their reflective practices in relation to their experiences in the teaching profession. Additionally, Boukahos also contends that no relationship could be established between reflective thinking and the number of years gained as experience by the participating instructor.

However, numerous teachers have clearly demonstrated that experienced practitioners are more probable to engage in reflective teaching practices and the same cannot be said about those with little or no experience (Efe, 2009; Ostaz, 2011).

From table (5), it is apparent that the amount of experience gained by a practitioner has an impact on their level of reflective practice. This is contrary to the results found in the works of Rashidi & Javidanmehr (2012), and Ansarin et al. (2015). In these studies, it was established that teaching experience has no significant effect on the quality or level of teaching practice. On the other hand, Saylor (2013) was of the opinion that a strong correlation exists between reflective teaching and experience gained. Likewise, Impedovo & Malik (2016) reported that practitioners with credible experience demonstrated critical attitude toward their practice with the aim of improving student achievement. The findings of this research are consistent with the findings stated in the studies by Saylor (2013) and Impedovo & Malik (2016).

Thus, it can be concluded that despite the notion that the amount of teaching experience has no effect on the effectiveness of reflective teaching practice, there is substantial evidence to show that the opposing theory is true. In other words, the more experienced a teacher is, the higher the likelihood of reflective practice being implemented. To this extent, this study asserts that practitioners with more years of experience engage in reflective practice more than those with less experience. This is based on the findings which highlighted a difference between senior teachers and their novice counterparts regarding reflective practice.

To investigate any statistically significant differences in the estimation degree of the critical reflective practices due to the educational qualification variable, the researcher used the One-Way Anova -test.

From Table (6), there is no significant difference in the estimation degree of the critical reflective practices due

**Table 4:** Significant Differences in the Estimation Degree of the Critical Reflective Practices Due to the Gender

Male		Female		T	Df	Sig
Mean	SD	Mean	SD			
3.22	0.784	3.59	0.699	1.271	221	0.612

**Table 5:** Significant Differences in the Estimation Degree of the Critical Reflective Practices Due to the Years of Experience Variable.

Less than 5 years		Between 6 and 10 years		More than 10 years		F	Df	Sig
Mean	SD	Mean	SD	Mean	SD			
4.19	0.601	3.19	0.688	5.17	0.433	52.684	220	0.00

**Table 6:** Significant Differences in the Estimation Degree of the Critical Reflective Practices Due to the Educational Qualification Variable

Bachelor		Master		PhD		F	Df	Sig
Mean	SD	Mean	SD	Mean	SD			
3.77	0.703	3.69	0.711	3.72	0.688	13.761	220	0.121



Table 7: The Means and Standard Deviation for the second Axis

No	Phrase	Mean	Std. Deviation	Rank
1	Individual practice of mind reflection.	2.64	0.57	3
2	Individual practice of reflection in writing.	2.44	0.801	4
3	Practice of mind reflection with a colleague within the same school.	2.66	0.702	2
4	Practice of mind reflection with another individual outside the school.	2.81	0.432	1
5	Practice of reflection in writing with a colleague at the same school.	2.39	0.801	6
6	Practice of reflection in writing with another individual outside the school.	2.41	0.651	5
7	Group practice of mind reflection with colleagues within the same school.	2.33	0.688	7
8	Group practice of mind reflection with teachers outside the school.	2.19	.831	8
General mean		2.48	0.68	

to educational qualification variable. These findings are consistent with other studies such as Ostaz (2011) and Shaheen (2012) which concluded that there were no statistically significant differences based on educational qualification variable on teachers' reflective practices.

### What strategies do teachers use to reflect on their practices?

To study the strategies, use by teachers to reflect on their practice, the researcher used the mean, standard deviation, and the rank for each phrase as follows:

From Table (7), we conclude that strategies teachers use to reflect on their practice were highlighted through the (agree) option. The mean was (2.48) and standard deviation as a low value of (0.68). This indicates homogeneity in the opinions of the study sample members on this axis. Similarly, all the questionnaire items had low values of standard deviation, indicating homogeneity in the opinions of the study sample on the aforementioned items

After ranking the items, first place was given to the item which stated the "practice of mind reflection with another individual outside the school". The second item in ranking was "practice of mind reflection with a colleague within the same school." As shown in the table, the highest ranked were those practitioners who engage in communal practice of reflection with colleagues within the same school or from elsewhere.

The items ranked in the middle of the standings include "individual practice of mind reflection" and "individual practice of reflection in writing". This supports the notion of reflection-in-action as presented by Schon (1987); the author suggested that this type refers to the importance of practitioner awareness of their decisions while engaged in practice and their ability to take necessary action when called upon.

The last two items in the ranking were "mind reflection in writing with a group of teachers within the school" and "mind reflection in writing with a group of teachers outside

the school." Writing in groups whether inside or outside the school was ranked last in the table.

### CONCLUSION

This research has revealed the computer science teachers' reflective practice in high schools in Saudi Arabia. The estimation degree of the critical reflective practices of male and female teachers was highlighted through the (agree) option. This study has produced findings which revealed that teachers unanimously agree on the importance of implementing critical reflective practices. Most of the participating teachers opted to agree with the practice of reflection after a training session. There is no significant difference in the estimation degree of the critical reflective practices due to the gender or qualification variable. However, the results presented a significant difference in the estimation degree of the critical reflective practices due to the years of experience variable. These differences were found in the group which had participants with more than 10 years of experience.

It is evident that teachers employed different strategies to reflect on their practice. After ranking the items, first place was given to the item which stated that "Practice of mind reflection with another individual outside the school." The second item in ranking was "Practice of mind reflection with a colleague within the same school." Given what is shown in the standings, it is clear that teachers who practice reflection communally with others were ranked higher.

This study proposes that teachers be thoroughly trained on practicing strategies used in reflective approaches through courses and workshops. In addition to this, there is a need to help practitioners develop their professional conduct and motivate them to engage in reflective practices. Similarly, the study advocates spreading awareness on the importance of reflective thinking. The final recommendation is for the teacher's supervisor to request the practitioner to maintain a reflective journal with the aim of constantly engaging in reflective practice.

## REFERENCES

- Al-Hashim, A. (2019). Critical thinking and reflective practice in the science education practicum in Kuwait. *Utopía Y Praxis Latinoamericana: Revista Internacional De Filosofía Iberoamericana Y Teoría Social*, 24(6), 85–96. <https://dialnet.unirioja.es/descarga/articulo/7406879.pdf>
- Abu Askar, M. & Abu Sultan, Abi. (2017). The reflective practices of science teachers in the upper basic stage in the northern Gaza. *Palestine University Journal for Research and Studies*, 7(1), 169–192. <https://doi.org/10.12816/0037272>.
- Abu Sultan, A., & Abu Asakar, M. (2017). Estimating the degree of reflective practices among science teachers in the upper primary stage in North Gaza, *Palestine University Research Journal*, 7(1), 212–243.
- Ahmed, M. (2020). The reality of applying the principles of critical education in pre-university education in Egypt and the requirements of their activation. *Educational Journal*, (78)78, 2245–234. doi: 10.21608/edusohag.2020.110369
- Aldahmash, A. H., Alshmrani, S. M., & Almufti, A. N. (2017). Secondary School Science Teachers' Views about Their Reflective Practices. *Journal of Teacher Education for Sustainability*, 19(1), 43–53. <https://doi.org/10.1515/jtes-2017-0003>
- AlRashidi, F. (2018). Estimating the degree of using reflective practices among secondary school teachers in Buraidah Governorate from their point of view. *Journal of the College of Basic Education for Educational and Human Sciences*, (38).
- Altın, M. & Saracaloğlu, A. S. (2018). Yaratıcı, Eleştirel ve Yansıtıcı Düşünme: Benzerlikler-Farklılıklar . *Uluslararası Güncel Eğitim Araştırmaları Dergisi* , 4(1), 1-9. Retrieved from <https://dergipark.org.tr/en/pub/intjces/issue/38168/440859>
- Anagun, S., Atalay, N., Kılıç, Z., & Yaşar, S. (2016). Öğretmen Adaylarına Yönelik 21. Yüzyıl Becerileri Yeterlilik Algıları Ölçeğinin Geliştirilmesi: Geçerlik Ve Güvenirlik Çalışması\*. *Pamukkale University Journal of Education*. 10.9779/PUJE768.
- Ansarin, A. A., Farrokhi, F., & Rahmani, M. (2015). Iranian EFL teachers' reflection levels: The role of gender, experience, and qualifications. *The Asian Journal of Applied Linguistics*, 2(2), 140–155.
- Asakereh, A., & Yousofi, N. (2018). Reflective Thinking, Self-Efficacy, Self-Esteem and Academic Achievement of Iranian EFL Students in Higher Education: Is there a Relationship? *International Journal of Educational Psychology*, 7(1), 68. <https://doi.org/10.17583/ijep.2018.2896>
- Baljoun, K. (2010). The extent to which science teachers master reflective teaching practices and its relationship to their level of teaching competence [paper presentation]. Fifteenth Annual Meeting - Education Development: Visions, Models and Requirements. Saudi Society for Educational and Psychological Sciences, Riyadh.
- Benade, L. (2015). Teachers' critical reflective practice in the context of twenty-first century learning. *Open Review of Educational Research*, 2(1), 42–54. <https://doi.org/10.1080/23265507.2014.998159>
- Boukayos, K. (2017). The relationship of reflective thinking to the teaching performance of student's teachers of science and mathematics, *International Journal of Educational Research, United Arab Emirates University* 1(41), 39–65.
- Boyd, V. A., Woods, N. N., Kumagai, A. K., Kawamura, A. A., Orsino, A., & Ng, S. L. (2022). Examining the Impact of Dialogic Learning on Critically Reflective Practice. *Academic Medicine*, 97(11S), S71–S79. <https://doi.org/10.1097/acm.0000000000004916>
- BuQhoos, K.A. (2017). "Relationship between reflective thinking and teaching performance of student teachers specialized in," *International Journal for Research in Education*. 41(1), Available at: <https://scholarworks.uaeu.ac.ae/ijre/vol41/iss1/2>
- Choy, C., Lee, M. & Sedhu, D. (2019). Reflective thinking among teachers: development and preliminary validation of reflective thinking for teachers questionnaire. *Alberta Journal of Educational Research*. 65. 37-50.
- D'Alessio, F. A., Avolio, B. E., & Charles, V. (2019). Studying the impact of critical thinking on the academic performance of executive MBA students. *Thinking Skills and Creativity*, 31, 275–283. <https://doi.org/10.1016/j.tsc.2019.02.002>
- Decker, K. B., Cook, G. A., Brophy-Herb, H., & Torquati, J. (2021). Students' experiences of reflective practices as pedagogy in early childhood higher education. *Journal of Early Childhood Teacher Education*, 1–27. <https://doi.org/10.1080/10901027.2021.2020938>
- Efe, R. (2009). *Cypriot Journal of Educational Sciences*. Sciences, 4, 72–86.
- Farwana, M. K. (2006). The level of reflective teaching among students who teach English at the universities of Gaza. (Publication number 695229). [Master's thesis, College of Education - Islamic University, Palestine], Dar Al-Mandumah database, thesis
- Ferraro, J. M. (2000). Reflective practice and professional development. ERIC Digest: ED449120.
- Finlay, L. (2008). Reflecting on Reflective practice . PBLB paper, 52.
- Florez, M. C. (2001). Reflective teaching practice in adult ESL settings. ERIC Digest
- Gajda, A. (2016). The relationship between school achievement and creativity at different educational stages. *Thinking Skills and Creativity*, 19, 246–259. <https://doi.org/10.1016/j.tsc.2015.12.004>
- Halpern, D.F. (2001). Assessing the effectiveness of critical thinking instruction. *The Journal of General Education* 50(4), 270–286. doi:10.1353/jge.2001.0024.
- Halpern, D. F., & Butler, H. A. (2011). Critical thinking and the education of psychologically literate citizens. *The Psychologically Literate Citizen*, 27–40. <https://doi.org/10.1093/acprof:oso/9780199794942.003.0020>
- Halpern, D. F., Millis, K., Graesser, A. C., Butler, H., Forsyth, C., & Cai, Z. (2012). Operation ARA: A computerized learning game that teaches critical thinking and scientific reasoning. *Thinking Skills and Creativity*, 7(2), 93–100. <https://doi.org/10.1016/j.tsc.2012.03.006>
- Impedovo, M. A., & Khatoon Malik, S. (2016). Becoming a reflective in-service teacher: Role of research attitude. *Australian Journal of Teacher Education*, 41(1).
- Johnson, D. (2011). The effect of critical thinking instruction on verbal descriptions of music. *Journal of Research in Music Education*. 59. 257-272. 10.1177/0022429411415860.
- Keshik, M. (2019). Reflective practices of faculty members at Damascus University and their relationship to their job

- performance. *Journal of the Federation of Arab Universities for Education and Psychology*, 17(3), 249-287. Available at: search.shamaa.org.
- Killen, R. (1995). Improving Teaching Through Reflective Partnerships. *To Improve the Academy*, 14(1), 125-141. <https://doi.org/10.1002/j.2334-4822.1995.tb00287.x>
- McAlpine, L., Weston, C., Berthiaume, D., Fairbank-Roch, G., & Owen, M. (2004). Reflection on teaching: Types and goals of reflection. *Educational Research and Evaluation*, 10(4-6), 337-363. Retrieved from: <https://doi.org/10.1080/13803610512331383489>.
- Minott, M.A. (2009). Reflection and reflective teaching: A case study of four seasoned teachers in the Cayman Islands. Germany: VDM publishers
- Murphy, K.R. (2014). The Effect of Reflective Practice on High School Science Students' Critical and Reflective Thinking.
- Nazir, H. & Shah, N. & Jammu, A. & Muhammad, M. (2022). Role of prospective teachers in promoting reflective practices at secondary level.
- Obaidat, L. (2017). The reality of the use of reflective practices and their impact on the achievement of motivation of the teachers of the upper elementary stage in Irbid governorate. *An-Najah University Journal of Humanities*, 31(12), 2275-2300.
- Ogonor, B. & Badmus, M. (2006). Reflective teaching practice among student teachers: the case in a tertiary institution in Nigeria. *Australian Journal of Teacher Education*, 31(2). <http://dx.doi.org/10.14221/ajte.2006v31n2.2>.
- Ostaz, M. (2011). The level of ability of reflective thinking of educational problems which facing the science teachers in the basic stage in UNRWA and Governmental schools in Gaza. *Journal of Al-Azhar University -Gaza, Humanities*, (13B).1329-1370
- Qutoshi, S. (2018). Critical reflective practice as an approach to developing transformative living-theory. *Dhaulagiri Journal of Sociology and Anthropology*. 12. 107-111. [10.3126/dsaj.v12i0.22186](https://doi.org/10.3126/dsaj.v12i0.22186).
- Rayan, A. (2014). The degree of reflective practices of mathematics teachers in Hebron directorates of education & its relationship with teaching self-efficacy. *Al-Manarah for Research and Studies*, 20(1). 143-173
- Rayyan, A. (2014). The reality of reflective teaching among teachers of mathematics in basic education stage, a research presented to the Conference on Improving the Quality of Education in Arabic, English, Science and Mathematics, held at the Arab American University on 17 March.
- Reagan, T. (1993). Educating the reflective practitioner: The contribution of philosophy of education. *Journal of Research and Development in Education*, 26 (4), 189-196.
- Rodgers, C. (2002). Defining Reflection: Another look at John Dewey and reflective thinking. *Teachers College Record: The Voice of Scholarship in Education*, 104(4), 842-866. <https://doi.org/10.1111/1467-9620.00181>
- Saylor, L. (2013). The relationship between teacher quality and reflective practice. (Electronic Thesis or Dissertation). Retrieved August 15, 2021 from <https://etd.ohiolink.edu/>
- Schon, D. A. (1987). Educating the reflective practitioner: Toward a new design for teaching and learning in the professions. San Francisco: Jossey-Bass.
- Schoonard, J., Lee, J., Strait, E., Cabrera, J., & Garner, J. (2020). 787 burn resuscitation critical reflective practice. *Journal of Burn Care & Research*, 41(Supplement\_1), S228-S229. <https://doi.org/10.1093/jbcr/iraa024.364>
- Scott, S., Issa, T. & Issa, T. (2008). Closing the loop. The relationship between instructor-reflective practice and students' satisfaction and quality outcomes. *International Journal of Learning*, 15(3). 109-120.
- Shaheen, M.(2012). Identifying the level of reflective practices of faculty members at Al Quds Open University and its relationship to their attitudes towards self-professional development in the light of some variables. *Journal of Al-Azhar University -Gaza, Humanities*,14(2). 181-208.
- Rashidi, N., & Javidanmehr, Z. (2012), Pondering on issues and obstacles in reflective teaching in Iranian context. *American Journal of Linguistics*, 1(3), 19-27.
- Rezaeyan, M., & Nikoopour, J. (2013). The relationship between reflectivity of foreign language teachers with Iranian students' achievement. *Journal of Language Sciences & Linguistics*, 1(1), 9-20.
- Stella, N., Mylopoulos, M., Kangasjarvi, E., Boyd, V., Teles, S., Orsino, A., Lingard, L., & Phelan, S. (2020). Critically reflective practice and its sources: A qualitative exploration. *Medical Education*. 54(10). 312-319. <https://doi.org/10.1111/medu.14032>.
- Tshering, K., Seden, K. & Utha, K. (2022). Exploring physics teachers' reflective practices and the challenges. *Journal of Educational Sciences*. 18. 1-17.
- Ward, A., & Gracey, J. (2006). Reflective practice in physiotherapy curricula: a survey of UK university based professional practice coordinators. *Medical Teacher*, 28(1), e32-e