A proposed electronic tool for managing educational procedures, following-up teachers' performance in the classroom, and measuring their attitudes

Sami Abdelhamid Mohamed Issa [1, 2, *]

[1]Computer Department, Community College, Prince Sattam bin Abdulaziz University, Al-Kharj, Saudi Arabia
[2]Educational Technology Department, Specific Education College, Mansoura University, Mansoura, Egypt

A R T I C L E I N F O

A B S T R A C T

The educational process depends on many procedures, which lead to positive educational outcomes. The research depends on modern technology in the design and development of an electronic tool that manages the teaching process in the classroom from beginning to end. The purpose of the research is to monitor the teacher's procedures by following up on all teaching procedures using an electronic tool for managing the educational process. The teacher implemented all educational lesson procedures in the classroom through the proposed electronic tool according to its prior preparation. The researcher designed a cognitive achievement test for students of the experimental and control groups to measure the effectiveness of the electronic tool. An attitude scale was applied to teachers to identify their attitude toward using the tool in monitoring procedures in the classroom to ensure the effectiveness of the proposed electronic tool in developing the educational process and enriching the academic situation. The research's results indicated that using the proposed electronic tool improved students' educational achievement by comparing the students' results in the experimental and control groups. The teachers' attitude toward using the tool was also characterized as favorable and desired. The research recommended applying the proposed electronic tool to a more significant number of teachers in different specializations, using the tool reports in overcoming problems in the classroom, and conducting more studies related to performance follow-up and observation in the classroom.

1. Introduction

The teaching process occurs within the classroom between the teacher (as a mentor, supporter, and assessor) and the student (as a respondent to the teacher). Therefore, the teacher is considered the fundamental element in the learning process. Many studies have dealt with the impact of many external and internal variables on the educational process. Many of them dealt with the internal and external educational environment elements, such as preparing the content and the learning strategies (Gabriel, 2005). These establish the educational objectives, to be achieved during the learning process and determine feedbacks and extracurricular activities necessary to improve the learning process (David and Macayanan, 2010; Fasko, 2001). Modification in these procedures may be made based on the teacher's preference or the nature of the content. With the advent of technological tools that electronically regulate the educational process, "Learning Management Systems" support communication between the teacher and the learner through receiving instructions, handing over assignments, taking tests, and other capabilities added to the learning process. However, the classroom happenings cannot be measured or monitored directly to provide support and guide to the teacher through a report of occurring.

The research intends to continuously monitor the education process in the classroom before, during, and after the lesson. In addition, it provides the necessary support to the teacher through the reports that result from the proposed electronic tool. The proposed electronic tool gives the supervisor the essential indications to evaluate the learning process

at the end of the lesson. Furthermore, the research focuses on making the learner the core of the educational process. It monitors the teacher and highlights his shortcomings. A teacher has the freedom to increase the time to achieve a specific objective according to the teaching conditions in the classroom. It is the fundamental role of the proposed electronic tool. So, it is necessary to verify whether the teacher prepares the students for the lesson and uses the appropriate aids and other procedures that should be performed before beginning the teaching process.

The research aims to design the proposed electronic tool for managing education procedures in the classroom and monitor the learner's performance. It detects the effectiveness of the proposed electronic tool for managing education procedures in the classroom and following up the teacher's performance. It identifies teachers' attitudes toward using the proposed electronic tool to manage education procedures in the classroom and observing their performance. It is noticeable that the intervention has been made to improve the external educational conditions. Still, the technical intervention has not been done to improve education within the classroom and monitor the teacher's performance. It is achieved traditionally through the supervisor, which does not give the correct picture of the teaching process. This way is the primary evaluation that is relied on in the teacher promotion or getting a higher job grade. The teachers themselves are not satisfied with this type of evaluation, which may be affected by personal relationships. A questionnaire was applied to the teachers. It aimed to measure the extent of satisfaction with the supervisor's assessment in the classroom. As a result, more than 72% of teachers did not have the required confidence in this type of assessment, and 16% of teachers considered it a routine evaluation with law value. At the same time, 12% of teachers accepted this type of evaluation because they have not found a better way. The supervisors are responsible for teachers' evaluation and monitoring process, which does not have a standard model. Still, the supervisor in his evaluation of the teacher depends on some previously known indicators. This evaluation does not direct the teacher toward improving his future performance.

The importance of the research lies in highlighting the role of modern technology represented in electronic programs and tools designed for specific objectives in improving the educational environment in the classroom. It controls the class management electronically, which contributes to the learning process organization and integrates the elements of the educational situation. It leads to performance improvement of the teacher, which reflects on the learner. It promotes educational activities in the classroom and achieves them according to the educational situation and the learning environment. It produces an electronic tool that contributes to control classroom performance during teaching subjects and attain maximum

benefit from learning time. It achieves fair monitor for the teacher instead of the traditional method used by the supervisor, which lacks fairness and transparency.

2. Theoretical framework and literature review

The main objective of learning has changed to convert it into desired education for learners. Thus, it achieves the highest expected benefit, depending on less effort and time. It is achieved by employing the available technological developments with the computer capabilities used in the educational process. The information age in which we live and the emergence of modern education methods have helped to employ computers in education. It is also done by using previous experiences of engaging computers in education. Some are shared via the internet to achieve the direct benefit, and some are reviewed through previous studies. The educational process also needs a new stage of development called non-systemic learning. It provides the academic, scientific shift from the standard template for the classroom or the laboratory for learning opportunities through the so-called educational environment. Electronic programs are characterized by flexibility in finding all possible solutions to students' issues during the training process. In addition, it evaluates the students' response directly and allows students to seek the explanation for clarification if a solution to them is not possible.

Many procedures take place in the classroom. These may differ from one teacher to another and from one content to another, but essential functions are common among all classmates (Kember, 2000). It includes identifying and organizing the educational content in advance before starting the teaching process. It comprises achieving the educational objectives, the time required to accomplish each of the purposes, and the basis for attaining those objectives according to the educational situation requires. It consists of the educational tools used to deliver scientific content, learning strategy used in teaching, feedback and the necessary structural evaluation, extra-curricular and enriching activities, and resources and tools needed.

Teacher plays many roles in the educational process, one of the most important ones is to make the successful educational process. In today's world, the teacher's role has evolved. He must provide coordination and development of knowledge, improve thinking skills, and employ information technology in education. It is his responsibility to take care of individualization of instruction, link the school to the community, take care of evaluation methods and extracurricular activity, teach students the language of dialogue, and instill patriotism and belonging to it among students. It is found that the teachers are blamed for negligence, depending on the results obtained. It is mainly due to the inadequacy of his preparation in faculties and institutes. Therefore, improving and developing the teacher's performance leads to obtaining the

required educational outcomes. Muhammad (2015) conducted a study aiming at continuous monitoring and follow-up of students to bring good academic and educational returns. The research was not based on monitoring students only, but for all parties of the educational process: the student, the teacher, the parent, and the school administration. It encouraged everyone to share and follow-up system, which helped parents observe their children's performance and academic progress.

NCATE (2000) recommended the American National Council for the Accreditation of Teacher Preparation Programs. It is a teacher performance standard that leads to more quality and effective teaching, enabling them to improve the students' achievement. Darling-Hammond (2000) confirmed a significant relationship between the quality of teacher preparation based on performance standards and the performance improvement level of the students of these teachers. It is crucial to evaluate and monitor teacher performance (Al-Ruwaithi and Al-Roasaa, 2013). The teacher should deal with recent changes that occur to the curriculum because he is the actual implementer of the curriculum. The evaluation gives the teacher the necessary information about his performance according to precise criteria determining the required performance levels. The assessment also contains the type of changes needed for the teacher, whether in teaching, learning environment, or learning resources. It identifies strengths and weaknesses that explain the teachers' needs for qualifying programs or professional development courses.

This research seeks to follow these procedures through the proposed electronic tool and improve it to reach the best techniques and educational outcomes required. In the initial visualization of the proposed electronic tool, the teacher formulates objectives and other academic procedures according to the learner's content. Besides, it determines the appropriate time to achieve each of those objectives, following up teacher performance in the classroom and managing the class according to the purposes. The more the teacher adheres to the prescribed duration of each goal, the more successful the educational process will be.

3. Research methodology

The research has used two approaches. The descriptive approach addresses the theoretical framework. At the same time, the quasi-experimental method is applied for its suitability to measure the effect of the independent variable (the proposed electronic tool) on the dependent variables (managing education procedures, following-up teacher performance, and teachers' attitude toward using the tool). The measurement tool is used to evaluate the effectiveness of the proposed electronic tool for managing educational procedures in the classroom. The attitude scale is applied for measuring teachers' attitudes toward using the proposed electronic tool in managing education procedures in the classroom. The treatment tool is used to manage the classroom's education procedures and follow up teacher's performance. Some hypotheses are formulated to achieve the purpose of the research. The first hypothesis is statistically significant differences at the level of 0.05 between the students' mean scores of the teachers' experimental group in the pre and post-application of the achievement test for measuring the effectiveness of the electronic tool in favor of the post-application. Second, there is a statistically significant difference at the level of 0.05 between the students' mean scores of the teachers' experimental group and the students' mean scores of the teachers' control group for the post-achievement test for measuring the effectiveness of the electronic tool in favor of the experimental group. Third, there are statistically significant differences at the level of 0.05 between the teachers' attitudes in the experimental group for the attitude scale toward the proposed electronic tool.

Because the Covid-19 epidemic imposes some preventive measures to limit the spread of the virus, it has resulted in the inability to apply to teachers or students in schools. The Ministry of Education in the Kingdom of Saudi Arabia has decided that teaching should be on university learning management systems and educational platforms in schools during the second semester of the academic year 1442 AH (2021 AD) (experimental application time. It made it impossible to conduct the experience to teachers and students in schools. Therefore, the current research tools were applied to achieve tests for students of the experimental and control groups at the university according to the proposed electronic tool. It was used on 34 students of the experimental group in the laboratories. These students were chosen to attend the practical application in the laboratories. At the same time, the scientific content was taught to 32 students of the control group by applying the tool to the control group on the Blackboard Learning Management System. These students opted to attend the practical application at home because of the availability of the necessary facilities. The attitude scale was applied to 8 faculty teaching staff who used the proposed electronic tool in the laboratories. The electronic tool was used, which was presented by faculty teaching staff at Prince Sattam bin Abdulaziz University, Al-Kharj Governorate, Kingdom of Saudi Arabia, in the practical application of the course. It was applied according to the decision issued on 06/01/1442 AH (01/14/2021 AD) using the learning management system (Blackboard) in teaching the theoretical aspect in universities and the practical application in the laboratories.

The research sample selection was based on a population composed of students in Grade 1 of the computer department, faculty of community, Prince Sattam Bin Abdul-Aziz University. They studied the "Computer Principles" course during the second semester of the academic year 1442 AH. In addition,

it comprised a sample of the department's professors who taught the courses to the different divisions of students.

The researcher prepared an achievement test about the "Computer Hardware and Software Components" unit. The trial's objective was to measure students' ability to acquire concepts related to the units, namely (computer hardware and software components, the role of computers in the teaching and learning processes, and computer viruses). These concepts were considered the course's central ideas, and these concepts covered the theoretical side of the system. The researcher formulated the test paragraphs after determining the objectives. When developing the sections, their relevance to the sample members' level was taken into consideration. Each concept contained 5 paragraphs, so the total number of test items in their final form was 15 items. The researcher also checked the validity and reliability of the scale. Besides, the researcher prepared the teachers' attitude scale toward using the tool in 14 paragraphs. It was achieved using the five-point Likert scale to measure the teachers' attitude toward using the tool in the classroom. The responses were measured according to the five Likert scales, i.e., very high, high, neutral, medium, and low.

Moreover, the researcher analyzed the "Computer Principles" course content for the "Computer Hardware and Software Components" unit. The objectives were defined based on achieving the students' level of comprehension of the four concepts. Then the researcher formulated the behavioral goals. Furthermore, the researcher built the concepts list that could be taught in the "Computer Principles" course in the "Computer Hardware and Software Components" unit for first-grade students majoring in computers.

3.1. Instructional design

The researcher is looking at an educational model for designing e-learning and learning environments (Azmy, 2008; Elgazzar, 2014; El-Desouky, 2012). The current research adopts El-Desouky's (2012) model for its compatibility with the design of electronic environments and the employment of e-learning development.

4. Research results and discussion

The first question: "What is the proposed electronic tool for managing education procedures in the classroom and following up the learner performance?" To answer this question, the researcher designed the proposed electronic tool. The tool design stage included requirements analysis, data collection, preparation of a prototype (modeling), extraction of opinions (arbitration), proposing technical structure (tool structure), selecting technologies and instruments, and design

and programming (implementation). The proposed electronic tool is mentioned in Table 1.

Table 1: The primary research tool

Items	Details	Notes
Interface development		
Development environment	Microsoft.net Technologies	Version 4.8
Development environment used	Visual Studio	Version 2019
Development languages	ASP.NET C# HTML CSS JS/JQ	Version 5 Version 3
Control the source code	GitHub	
Database		
Type	Microsoft Access	
Communication interface	ADO.Net	

A compiled version of the project was prepared in the tool publication stage. A master/sub-domain web was ready for addressing the project on the web. It comprised a hosting plan, publishing the project, and carrying out a primary run-off. The tool scenario stage was organized to prepare the test cases to form and apply these to various sections and screens. It was achieved by taking test notes and grouping these according to the section (if any), implementing the directives, and retesting the modified/corrected forms, which provided the final version of the proposed electronic tool. The tool's users' roles were divided as the system administrator, the teacher (lecturer), and the education supervisor. The system administrator manages work environment variables, such as specifying academic levels, grades, classes, and registering teachers. The teacher (lecturer) prepares the lessons, records them on the program, and implements them effectively. The education supervisor reviews class reports and make recommendations based on teachers' performance. The interface screen of the tool is shown in Fig. 1. On this screen, one can access the tool in three ways: a system administrator, a lecturer, or a supervisor, as shown in Fig. 2.

First: Preparation of the Lessons: The system administrator prepares the lessons, defines brainstorming, determines the procedural objectives and their content, and defines the roles of teacher and learner in this stage (Figs. 3 and 4). Then the system administrator can select the faculties (Fig. 5). The system administrator can also select the departments in each faculty separately, where the faculty is selected, then the grade, then the division, and press "save" (Figs. 6 and 7). Then the system administrator determines the evaluation mechanism that he will implement. He decides the extra-curricular activities and their sources and the enrichment activities and their sources. All this is saved until employing it during class implementation. The system administrator selects the grades in each faculty separately, the faculty, then the grade, and presses "save" (Fig. 8).
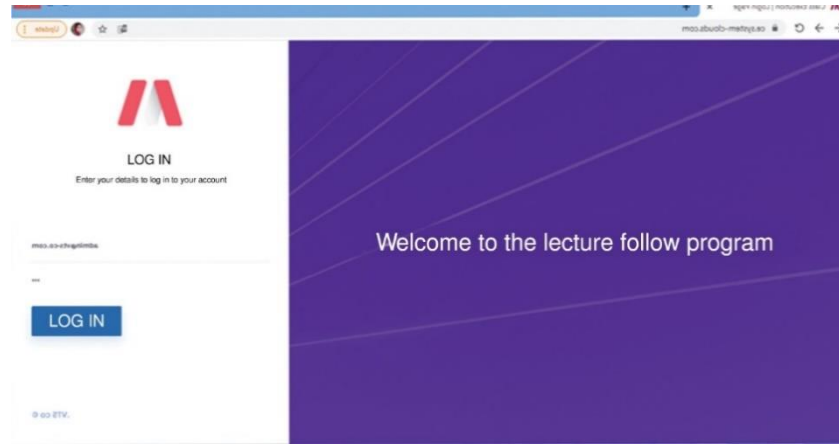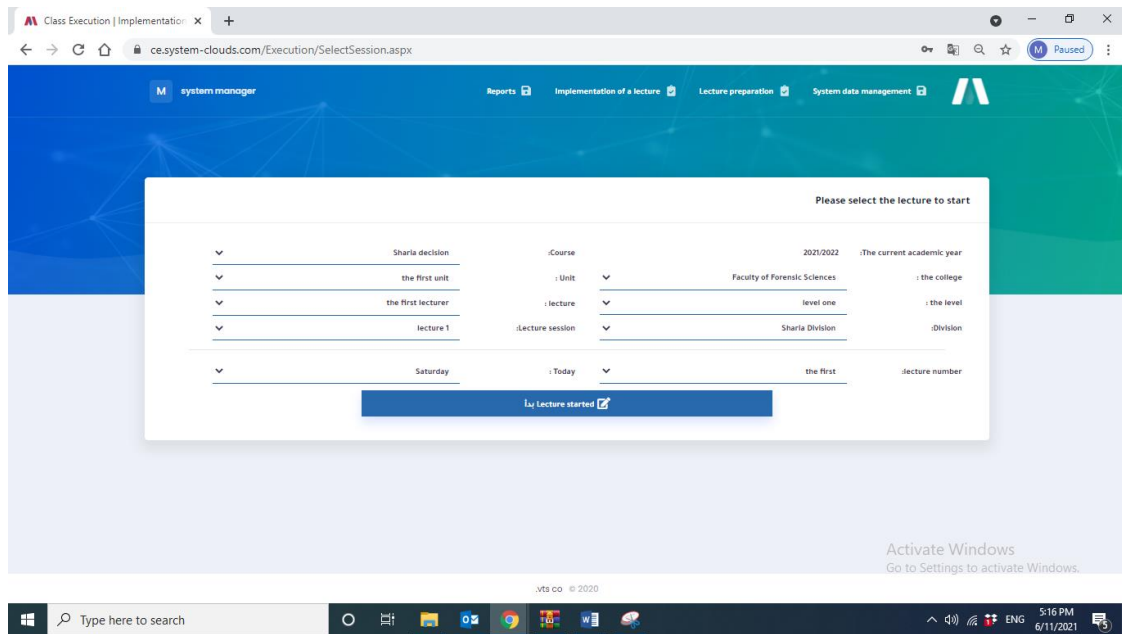
Fig. 1: The interface screen of the tool

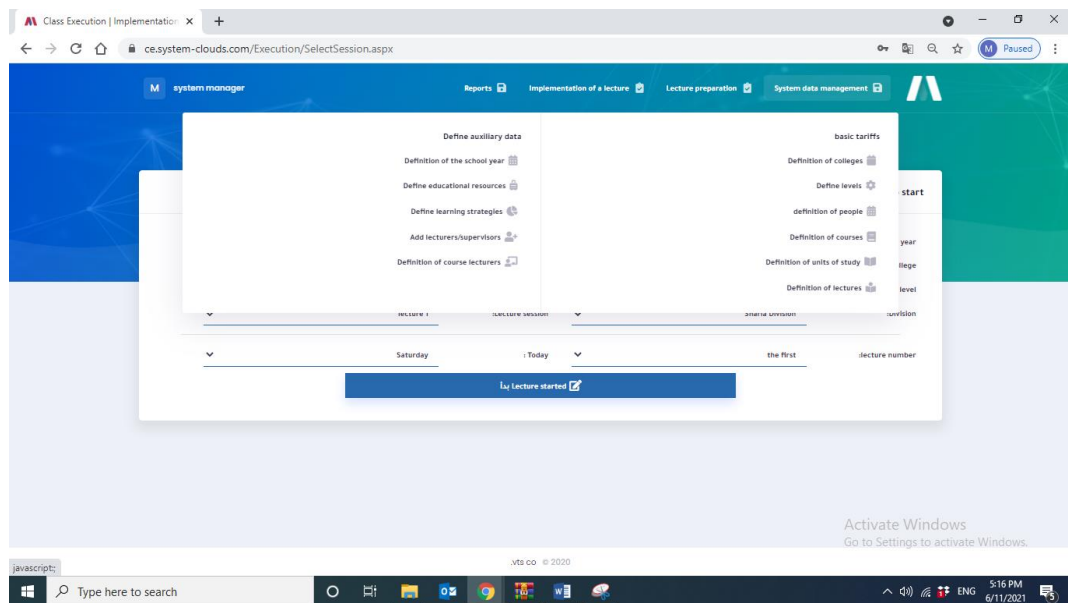**Fig. 2:** The login screen of the tool

Fig. 3: Input menu for the system administrator

basic tariffs

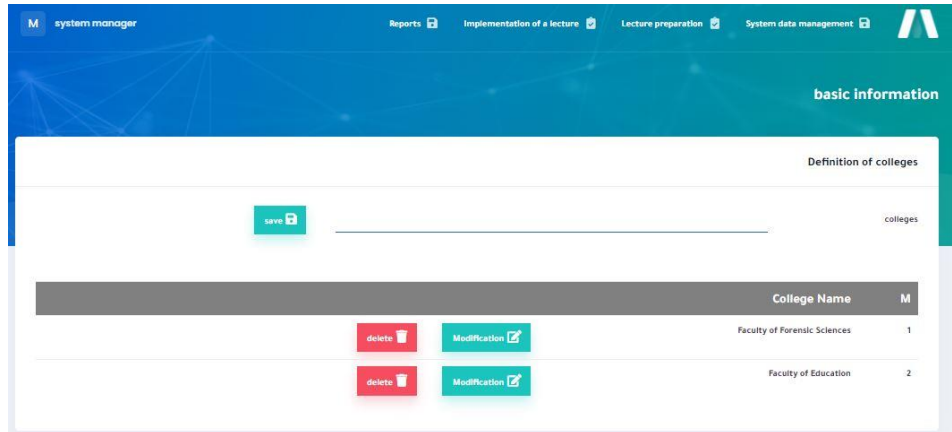Definition of colleges

Define levels

definition of people

Definition of courses

Definition of units of study

Definition of lectures

Fig. 4: The list of basic definitions

Fig. 5: Screen for faculties' selection

Fig. 6: Screen for faculties selection

Define auxiliary data

Definition of the school year

Define educational resources

Define learning strategies

Add lecturers/supervisors

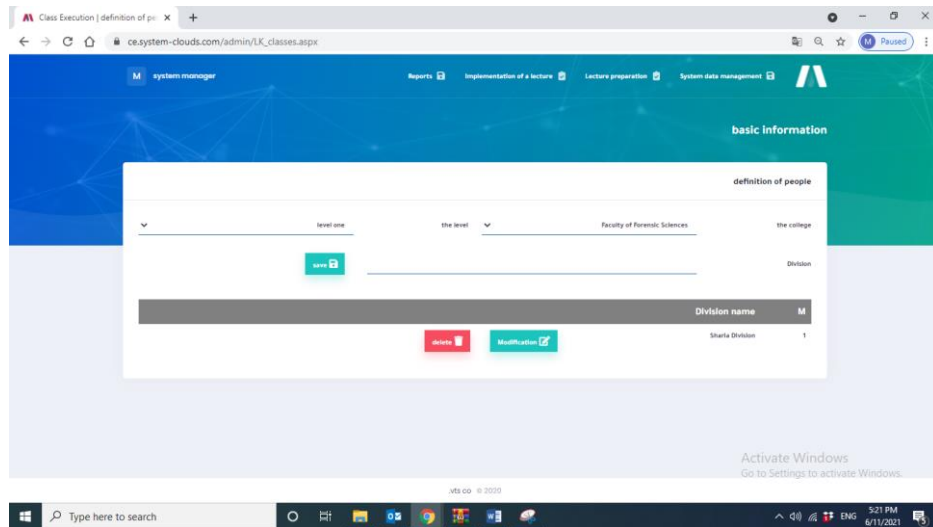Definition of course lecturers

Fig. 7: The list of assistance data

The system administrator can select the courses in each grade separately. The faculty has selected the grade, and the course, and pressed on "save." Specific lecturers can be chosen for each course by pressing on the lecturers' management (Fig. 9).

The system administrator can select the academic units for each course, where the faculty is selected, then the grade, the semester, the unit, and press "save" (Figs. 10 and 11)

The system administrator can add new academic years and assign a new study period as the current period (Fig. 12).

The system administrator can add learning resources and strategies to be used in the rest of the system (Figs. 13 and 14).

The system administrator can add a lecturer and grant him as a supervisor. He also writes all the essential data of the lecturer and then presses "submit the lecturer" (Fig. 15).

Fig. 8: Selection of grades in each faculty separately

Fig. 9: Selection of courses in each grade separately

Fig. 10: Selection of academic units for each course

61

Fig. 11: Selection of course lecturers

Fig. 12: Assignment of new academic years and study period

Fig. 13: Assignment of learning resources

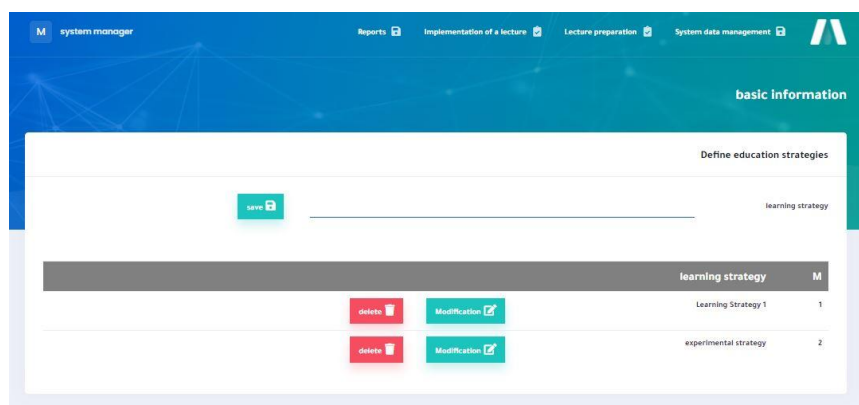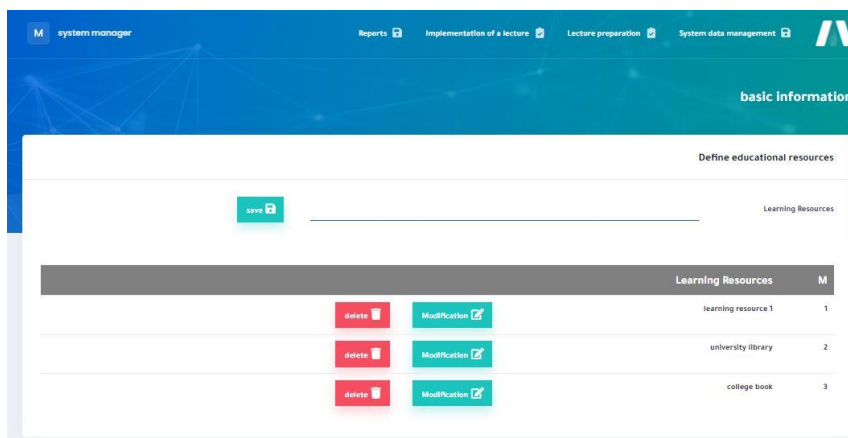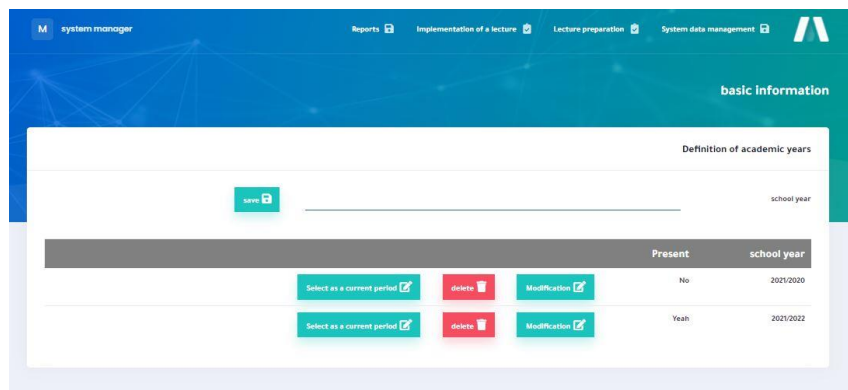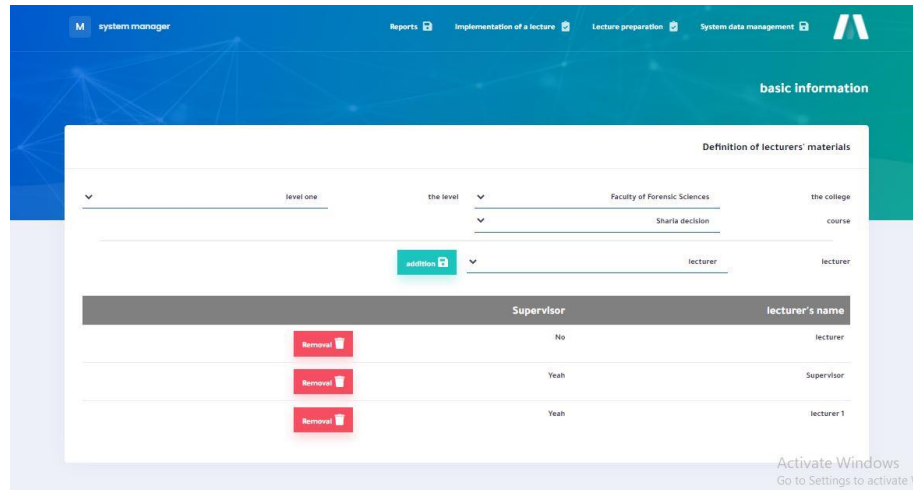**Fig. 14:** Assignment of strategies

Fig. 15: Assignment of lecturer and granting him as a supervisor; Second: Implementation of the Lessons (following-up)

Second: Implementation of the Lessons (following-up): It is an electronic form used by the teacher (lecturer) that contains the procedures of lesson implementation. It deals with each aspect of the lesson separately, starting with presenting the preparation to the students, using the resources, if any, and calculating the time taken to implement. Then it shows the objectives with their details, calculates the time taken to implement each goal, records the feedback through the evaluation of students' samples, reviews the extra-curricular and enrichment activities, and closes the lesson on the program. The lecturer selects the determination such as (faculty, course, unit, lecture) and then press "add a new lecture" to move to the preparation screen (Fig. 16).

The lecturer can prepare and implement the lectures (Fig. 17). Then moves to the report screen for the lecture implementation (Fig. 18).

Fig. 16: Selection of determination by the lecturer

Fig. 17: Preparation of lectures by a lecturer

Fig. 18: Report screen for the lecture implementation

The lecturer selects the lecture, preparation and the expected time for implementation, the instruments used, and the extra-curricular and enrichment activities (Fig. 19a and 19b).

(a)

(b)

Fig. 19: (a and b); Selection of time and instruments

Then press "save changes" to move to the screen of the lecture objectives addition. It inserts the objective and the roles of teacher and learner and uploads the educational instruments. Then press "add objective" to insert the next objective. When all the objectives are entered, press "completed." Thus, the lecturer is done with the preparation stage (Fig. 20).

Fig. 20: Objective and the roles of teacher and learner

Then, the lecture determination is selected (course, unit, faculty, etc.). Here choose the lecture number, day, then press "start the lecture" to move to the preparation screen (Fig. 21).

Fig. 21: The implementation stage of the lecture

Here, the preparation content and assistance instruments appear with a counter for the actual time for preparation and the lecture. Once pressed, it is counted ascending or descending. When finished, press "finish preparation" (Fig. 22).

Fig. 22: The preparation content and assistance instruments

Then, the lecture implementation screen appears, in which all previously entered data in the lecture preparation screen appears. So, after completing the explanation of the objective, press "end of the lecture" (Fig. 23).

Fig. 23: The lecture implementation screen

Third: Reports and the Supervisory Side: It is a section of the program where all reports are displayed and the lessons are implemented. It presents the procedures in the order that the teacher performed during the class. The educational supervisor or the school leadership can determine the strengths and weaknesses of the teacher's performance and make the necessary recommendations to improve the procedures of the educational process in the classroom. The supervisor can view the lecture's implementation report (Fig. 24) and monitor performance through reports (Fig. 25).

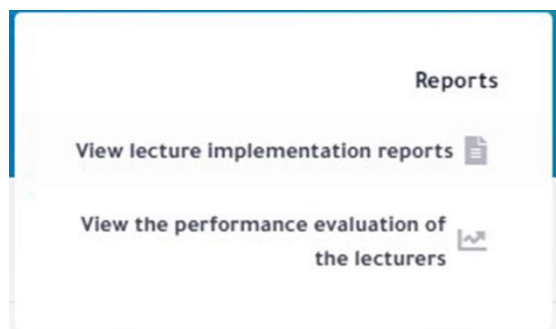**Fig. 24:** The lecture implementation report

Fig. 25: Performance monitoring

The supervisor can assess this report by pressing "report assessment" (Fig. 26). First, put a value for the assessment and then press "save assessment." A percentage will save the evaluation for the lecturer (Fig. 27). A lecturer can view the report by selecting and pressing "display assessment" (Fig. 28).

The second question: "What is the effectiveness of the proposed electronic tool for managing education procedures in the classroom and following-up teacher performance?" To answer this question, the researcher first started the actual application procedures for the electronic tool. A user account was prepared according to type (system administrator/teacher/supervisor).

Fig. 26: Access to report

Fig. 27: Report view

The system administrator logged in and defined the work parameters. At the same time, the teachers logged in and got acquainted with the system screens. Teachers were prepared according to their courses and implemented the lessons. The supervisor monitored the classes and took an observation. The experiment was applied to the three study groups (experimental group, control group, and teachers) according to the experimental design shown in Fig. 28.
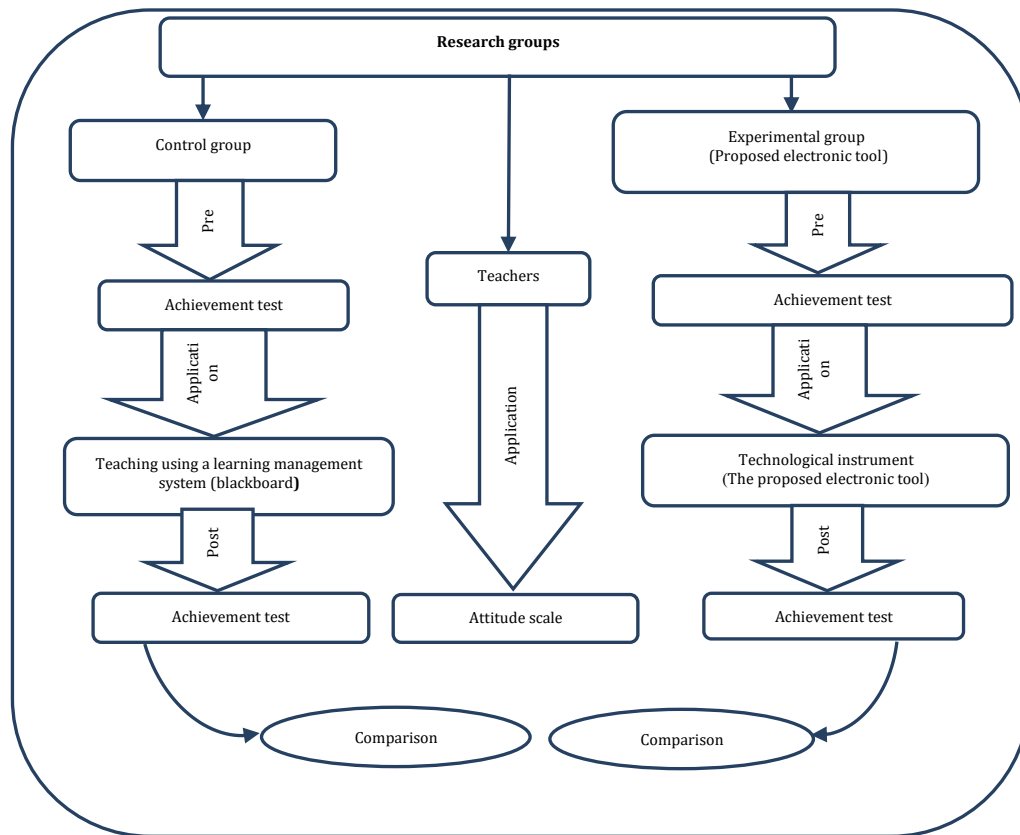

Fig. 28: Experimental design for research procedures

Secondly, the research hypotheses were tested to answer the second question.

The first hypothesis: There are statistically significant differences at the level of 0.05 between the students' mean scores of the teachers' experimental group in the pre and post-application of the achievement test for measuring the effectiveness of the electronic tool in favor of the post-application. The normal distribution test was performed on an experimental group to test this hypothesis, as shown in Table 2.

To verify this hypothesis, the researcher performed the psychometric properties of the achievement test:

- First: The validity of the test: After designing the test in its initial form, it was presented to a group of arbitrators. The modifications were made as suggested by the arbitrators.
- Second: The stability of the test: The stability of the achievement test is applying it to the exploratory sample to monitor the results in answering the test. The method of re-applying was used on the same sample with an interval of 15 days. By calculating the stability of the achievement test, it became clear that there is a strong correlation

between the first and second measurements. Hence the stability is corroborated.

Table 2: Results of normal distribution test for the experimental group

Students' degree	Kolmogorov-Smirnov Z	p-value
Pre-application	0.181	0.06
Post-application	0.134	0.128

The results from Table 2 indicate that there are no statistically significant differences at the level of 0.05, as it is noticed that the value of (p-value) is greater than 0.05 in the two variables. Therefore, the null hypothesis is accepted, which states that the research sample data are distributed normally for the two variables, and rejects the alternative hypothesis that states that the research sample data are not normally distributed. Accordingly, the appropriate tests for examining the statistical differences are the parameter tests of the variables according to the normal distribution condition (Table 3).

Table 3 indicates that there are statistically significant differences at the level of 0.05. The (p-value) is less than 0.05 between the students' mean scores of the experimental group in the pre/post-application of the achievement test. It measures the

effectiveness of the electronic tool in favor of the post-application mean.

Table 3: T-test results for two (paired) correlated samples

		Means	N	Std. Deviation	Std. Error Means	T	D$_f$	p-value
Pair 1	Post	12.3529	34	1.87297	0.32121	27.520	33	0.000
	Pre	3.3529	34	1.84033	0.31561			

The second hypothesis: There is a statistically significant difference at the level 0.05 between the students' mean scores of the teachers' experimental group and the students' mean scores of the teachers' control group for the post-achievement test to measure the effectiveness of the electronic tool in favor of the experimental group. The normal distribution test was performed on the control group to verify this hypothesis, as shown in Table 4.

Table 4: Test results of the normal distribution for the control group

Students' degree	Kolmogorov-Smirnov Z	p-value
Pre-application	0.173	0.015
Post-application	0.133	0.200

Table 4 indicates no statistically significant differences at the level of 0.01 or less. The value of

(p-value) is greater than 0.01 in the two variables. Therefore, the null hypothesis is accepted that the research sample data is distributed naturally for the two variables and rejects the alternative hypothesis that states that the research sample data are not normally distributed. Accordingly, the appropriate tests for examining the statistical differences are the parameter tests of the variables according to the normal distribution condition Table 5.

Table 5 indicates statistically significant differences at the level of 0.05. The (p-value) is less than 0.05 between the students' mean scores of the control group in the pre/post-application of the achievement test. It measures the effectiveness of the electronic tool in favor of the post-application means.

Table 5: T-test results for two (paired) correlated samples

		Means	N	Std. Deviation	Std. Error Mean	T	D$_f$	p-value
Pair 1	Post	8.4063	32	2.87211	0.50772	9.423	31	0.000
	Pre	3.5313	32	1.83135	0.32374			

The third question: "What are the teachers' attitudes toward using the proposed electronic tool to manage education procedures in the classroom and follow up their performance"? The third hypothesis was tested to answer this question.

The teacher orientation scale was prepared, and the psychometric properties were calculated as follows:

• First is the scale's validity: After designing the scale in its initial form, it was presented to a group of

arbitrators, and the modifications were done as suggested by the arbitrators. With this step, the scale becomes characterized by the sincerity of the arbitrators and is ready for application to the sample members.

• Second: Scale stability is mentioned in Table 6.

Table 6 shows the statistical stability coefficients according to the Cronbach Alpha method.

Table 6: The statistical stability coefficients according to the Cronbach Alpha method

Score	Statements
0.71	The design of the tool is organized and easy to handle
0.74	I can easily prepare the lesson on the tool
0.74	The tool helped me manage class time effectively
0.73	The presentation of the content in sequence in the tool contributed to the arrangement of my thoughts during the lesson
0.73	The tool provided me with several quota management aids
0.71	The tool helped me organize presentation of class content effectively
0.65	I can use the program without the need for help
0.65	In general, the tool contributed to the development of my performance in the classroom
0.73	The report issued by the tool on the course of the class may contribute to more effective performance in the classroom
0.68	The tool distracted me during class
0.72	I felt fair in my assessment
0.70	I got rid of the traditional supervisor evaluation and its routine procedures
0.73	Overall stability

It is clear from the above table results that all the stability coefficients for the questionnaire's statements ranged from 0.65 to 0.74. It indicates that the questionnaire is stable to achieve the research purposes and make the statistical analysis sound and acceptable.

The third hypothesis: There are statistically significant differences at the level of 0.05 between the teachers' attitudes in the experimental group for attitude scale toward the proposed electronic tool. This hypothesis was tested by measuring the teachers' attitudes of the experimental group toward the proposed electronic tool (Table 7).

Table 7: Measurement of the teachers' attitudes of the experimental group toward the proposed electronic tool

Series	Items	Means	Std	Order	Scale
1	The tool design is structured and easy to handle.	4.5000	0.53452	7	Very high
2	I can easily prepare the lesson on the tool.	4.6250	0.51755	4	Very high
3	There are entries in the preparation that I could not find a place to insert.	1.6250	0.74402	14	Very weak
4	The tool helped me manage class time effectively.	4.6250	0.51755	5	Very high
5	Displaying the content in the tool contributed to the arrangement of my thoughts during class.	4.0000	0.00000	10	High
6	The tool provided me with several class management tools.	4.5000	0.53452	8	Very high
7	The tool helped me to organize the display of class content effectively.	4.6250	0.51755	6	Very high
8	I can use the program without any help.	3.7500	0.46291	11	High
9	In general, the tool contributed to the development of my performance in the classroom.	4.5000	0.53452	9	Very high
10	The tool's report on the course procedures may increase the effectiveness of performance in the classroom.	5.0000	0.00000	1	Very high
11	The tool distracted me during class.	1.7500	0.88641	12	Very weak
12	There are more features I need that are not included in the tool.	1.7500	0.88641	13	Very weak
13	I felt fair in my evaluation.	4.7500	0.46291	2	Very high
14	I got rid of the traditional supervisor's assessment and routine procedures.	4.7500	0.46291	3	Very high
	Total mean for all items	3.91	1.23		

Table 7 indicates that the total items' mean was 3.91 with a standard deviation of 1.23. This result suggests that the agreement degree of the research sample on all items is high. Thus, the teachers' attitude toward using the tool is positive and satisfied with what the tool achieves in controlling learning procedures and achieving the possible benefit in the classroom for both teacher and student. The chi-square test was also performed to identify differences, as shown in Table 8.

Table 8: Chi-square test results

Chi-square value	D_f	p-value
0.750[a]	6	0.993

Table 7 indicates no statistically significant differences at a level of 0.05 or less. The (p-value) is greater than 0.05 between the teachers' attitudes of the experimental group on the attitudes scale toward the proposed electronic tool. It confirms the agreement between the teachers' views on the effectiveness of employing the proposed tool, its role in following up the procedures in the classroom, and the agreement on the fairness of the assessment issued by the tool's reports.

This research agrees with previous studies emphasizing the importance of constant attention to teacher performance evaluation. These studies address the weaknesses and causes of the low level of student achievement in some courses (Al-Ruwaithi and Al-Roasaa, 2013; David and Macayanan, 2010; Akpotu and Oghuvbu, 2004; Haydar and Hammoud, 2018). This research is also consistent with the previous studies in applying modern trends and techniques for evaluating teacher performance instead of traditional evaluation methods. Usually, the conventional methods lack the required neutrality and transparency, the teachers' involvement in the assessment, and a unique guide for evaluation based on specific criteria known to the teacher in advance (Ford-Brocato, 2004). In establishing following-up systems, Muhammad (2015) has shown an integrated monitoring system in schools. Still, it differs from this research, as monitoring was carried out from all elements of the educational situation (parents, teachers, supervisors,

and school administrators). It was not the aim to monitor teachers. Instead, the objective was to follow up and organize the educational procedures in the classroom. The teachers themselves set the guidelines and determined the extent of their achievement. Therefore, the teachers' attitude was positive toward using the proposed tool. Studies have also emphasized the quality of teacher performance, developing his abilities, and creating standard learning environments to obtain a better understanding of the classroom (Darling-Hammond, 2000; Kember, 2000; Fasko, 2001; Horng et al., 2005). It is consistent with this research objective in improving the internal educational environment in the classroom and controlling the way of learning to achieve the desired goals. However, this research distinguished from those studies in that the electronic tool issues the necessary reports on the supervisor performance and the system administrator. It allows access to the objectives that have not been achieved and attempted to achieve in the past. The research results also emphasized the importance of transferring towards electronic management to follow up performance, which is compatible with previous studies and takes advantage of prior experiences in applying modern technology-based management systems (Oyedmi, 2015; Kurfalı et al., 2017).

5. Conclusions and recommendations

The research concluded with the design and production of an electronic tool that was used in the classroom. The teacher controls it before the lesson by preparing the configuration, objectives, activities, and methods used. The tool follows up the teacher's performance during and after the lessons. It issues reports to identify the goals achieved and the teacher's performance in the classroom. The proposed electronic tool was applied to teachers in the classroom, resulting in improved students' achievement. The tool gained teachers' positive attitude toward its future use. Its use in the classroom did not distract teachers from the scientific explanation to students. It was due to the

prior preparation of all procedures that the teacher needed during the teaching.

The research recommends developing evaluation methods for teachers periodically in line with the technical development in teaching and learning. It can be achieved by establishing an independent performance evaluation association affiliated with the Ministry of Education that may include experts specialized in modern evaluation methods compatible with the technology. The study suggests making use of the electronic tool in various academic courses. Especially those that need to organize the teaching process, such as mathematics and science subjects. The responsible technical authorities are advised to do this in universities and the Ministry of Education. There is a dire need to conduct studies to combine the proposed electronic tool and learning management systems, which provides advanced follow-up and monitoring systems by officials in the Ministry of Education. Furthermore, it develops educational platforms whose importance and vital role appear because of the Corona crisis (Covid-19). The research emphasizes enriching teaching and learning by designing and producing technical assistance tools for the education process in the classroom. It can be accomplished in cooperation with the technical authorities and the responsible associations for curricula at the Ministry of Education. It is essential to hold courses and workshops specialized in modern evaluation systems by the Ministry of Education to promote the culture of electronic evaluation instead of the traditional evaluation between teachers and educational supervisors.

Acknowledgment

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Akpotu NE and Oghuvbu EP (2004). Performance appraisal of the Nigerian secondary school teachers: The students perspectives. International Studies in Educational Administration, 32(3): 44-57.

Al-Ruwaithi I and Al-Roasaa T (2013). Evaluating the performance of science teachers in teaching the first intermediate grade course according to suggested standards for teaching. Education and Psychology Message, 42: 93-116.

Azmy NG (2008). E-learning technology. House of Arab thought, Cairo, Egypt.

Darling-Hammond L (2000). Teacher quality and student achievement. Education Policy Analysis Archives, 8(1): 1-46. https://doi.org/10.14507/epaa.v8n1.2000

David AP and Macayanan JV (2010). Assessment of teacher performance. The Assessment Handbook, 3: 65-76.

El-Desouky MI (2012). Readings in informatics and education. Dar Al-Sahab for Publishing and Distribution, Cairo, Egypt: 162-170.

Elgazzar AE (2014). Developing E-Learning environments for field practitioners and developmental researchers: A third revision of an ISD model to meet e-learning and distance learning innovations. Open Journal of Social Sciences, 2(2): 29-37. https://doi.org/10.4236/jss.2014.22005

Fasko D (2001). Education and creativity. Creativity Research Journal, 13(3-4): 317-327. https://doi.org/10.1207/S15326934CRJ1334_09

Ford-Brocato J (2004). Teacher and administrator perceptions of teacher performance evaluation systems in two Georgia public school districts. Ph.D. Dissertation, Georgia Southern University, Statesboro, USA.

Gabriel M (2005). Creating effective educational environments: Online instructors define best practices. In the Society for Information Technology and Teacher Education International Conference, Association for the Advancement of Computing in Education, Phoenix, USA: 2229-2234.

Haydar MA and Hammoud FS (2018). The evaluation of performance of computer's teachers in private schools accordance to the standards of the automated computer's teachers. Al-Ustath Journal for Human and Social Sciences, 225(3): 273-304. https://doi.org/10.36473/ujhss.v225i3.214

Horng JS, Hong JC, ChanLin LJ, Chang SH, and Chu HC (2005). Creative teachers and creative teaching strategies. International Journal of Consumer Studies, 29(4): 352-358. https://doi.org/10.1111/j.1470-6431.2005.00445.x

Kember D (2000). Action learning, action research: Improving the quality of teaching and learning. Routledge, London, UK. https://doi.org/10.4324/9780203016343 **PMCid:PMC2270145**

Kurfalı M, Arifoğlu A, Tokdemir G, and Paçin Y (2017). Adoption of e-government services in Turkey. Computers in Human Behavior, 66: 168-178. https://doi.org/10.1016/j.chb.2016.09.041

Muhammad AA (2015). Integrated monitoring system for schools. M.Sc. Thesis, Faculty of Computer Science and Information Technology, Palestine: 1-156.

NCATE (2000). Performance-based accreditation standards. National Council for Accreditation of Teacher Education, 52 (11): 14. Available online at: https://ncte.gov.in/website/index.aspx

Oyedmi O (2015). ICT and effective school management: administer perspective. Lecture Notes in Engineering and Computer Science, 2217: 249-252. Available online at: https://www.mendeley.com/catalogue/41dd1d6a-d388-3c51-8229-74c64a4f97f7/