

An Electronic and Performance Test for the Applicants to Faculty of Education for Early Childhood in Egypt for Measuring the Skills of Teacher Students

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Abstract—The current study presents an electronic test to measure teaching skills. This test is a part of the admission system of the Faculty of Education for Early Childhood, Cairo University. The test has been prepared to evaluate university students who apply for admission the Faculty. It measures some social and physiological skills which are important for successful teachers, such as emotional adjustment and problem solving; moreover, the extent of their love for children and their capability to interact with them. The test has been approved by 13 experts. Finally, it has been introduced to 1,100 students during the admission system of the academic year 2016/2017. The results showed that most of the applicants have an auditory learning style. In addition, 97% of them have the minimum requirement skills for teaching children.

Keywords—Electronic test, early childhood, skills, teacher student.

I. INTRODUCTION

NOWADAYS, using technology in learning environments has been increased. Several schools employ modern educational tools in classrooms, such as QR-code [1]. Others use computers and cartoons as a tool for providing information and concepts [2].

Technology may give an advantage in delivering more repeatable results than human assessors [3]. The process of assessment is an integral part of the education. It includes investigating the information about learning results by identifying, collecting and interpreting this information. Operations the assessment assesses the systematic application of learning, both in education and in training [4].

The general model of the typical systems approach is shown in Fig. 1, it begins with an assessment to determine what the students know or can do. The result is compared with the required performance and knowledge. After that, learning strategies are developed to close the gap between the current and the desired situation. The learning intervention takes a different form including, discussion, lectures, projects, external reading or e-learning [5].

Computers can be used for different purposes in the educational and business environments. It can be efficient in

the concept of the e-portfolio. This document is meant for publication, for instance to provide an application to employment or for a higher education institution [6]. It is found that students were more inclined to create and use e-portfolios when they perceived their use for potential employers [7]. However, this dual use—for formative assessment and job seeking—can create tensions. For example, Barrett and Carney [8] found that using e-portfolios for formal assessments can be an impediment to constructivist learning.

During this learning, there will be some types of formative tests. These types of tests are usually represented as questions about what has been learned. Furthermore, in the formal systems, the formative tests judge what the students knows. In some systems, the results of the tests lead to another analysis to find the current gap with the target situation, and another intervention will be created. And the cycle is repeated.

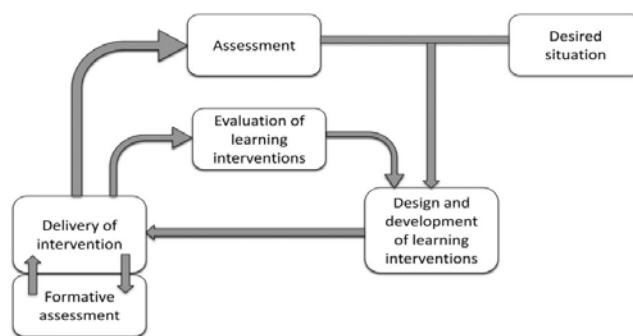


Fig. 1 A systematic approach to learning

The Socratic Circle [9] can be considered as a method of teaching and learning through continuous formative tests. Students in schools are frequently assessed to evaluate their level and their schools. In some countries, the results of these tests provide a comparative data to help parents for choosing the best school for their children. Modern technology facilitates the collecting and analyzing more tests' results than the paper-based methods. Moreover, modern technology is increasingly used to deliver learning; this technology also can be used to evaluate learning and to process the data for audiences.

There are four levels of using technology [10]: substitution,

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augmentation, modification, and redefinition. In the first level:

1. Substitution, in which the technology is a direct substitute and there is no functional change. Augmentation, in which the technology is still a direct substitute but now with some functional improvement.
2. Modification, in which the technology allows or even catalyses significant redesign of the tasks.
3. Redefinition, where the technology enables us to create new tasks that were previously inconceivable.

This work uses technology in the first stage where there is no change in the test function, but offers more efficiency. The electronic test depends on multiple choice questions (MCQs) which are easier to use with a computer than essay questions.

Modern technology based learning always tends to use MCQs, as they are more appropriate to machine than other types of questions, such as short answer or essay-type questions. In addition, they are often considered to be more objective.

The formal MCQs test consists of a sentence or a short paragraph followed by different alternative responses. Some of these responses are not correct and one or more are correct. The student needs to choose the correct response depending on the form of the question. MCQs have various advantages:

1. This type of questions assesses various levels of learning of basic recall.
2. MCQs provide an objectivity which cannot be achieved with essay questions.
3. They increase the reliability and validity because students can answer large number of question in a short time.

There are various formats for MCQs, questions:

1. Selecting the correct answer from four to five different alternatives.
2. Yes/no questions where the student selects a response.
3. Selecting more than one correct answer.
4. Rearranging different items into the correct order.
5. Matching the items in one list with those in a second list

The analysis of individual questions becomes more precise with increasing the number of individuals taking the tests. Some modern scanners have been created specifically for MCQ testing. These devices were developed for reading and processing the MCQ tests, in which the student marks the selected responses with a black pencil. The answer pages are then scanned, and the software detects the pattern of marks and compares the answered pattern with the rubric and a score is calculated automatically.

Although the scanners do not offer 100% accuracy, they are much better and faster than what can be achieved by human markers.

Tests could be embedded in learning environments and used for presenting the formative assessments as well as for the final test. In addition, it was simpler to use other forms of MCQ such as matching and ordering. However, it is required to design accurate MCQs. The efficacy of MCQ remains the same whether it is administered on paper or displayed and marked on a computer.

Recently, several attempts have been made to use some adaptive computing techniques to select MCQ items in real

time. Thus, the difficulty of the test could be changed according to the students' level. These attempts remain in the research environment and could be used with a few exceptions.

The first stage is finding out whether students can learn better by seeing, hearing, or moving information as a part of processing it. Style learning is usually a combination of visual, auditory, or kinesthetic according to the way the individual learns prefer. Generally, no particular style is better; it depends on what works best for the student. The theory is that each one always prefers to learn through one of these senses. The three styles are put together by a system called Visual, Auditory, and Kinesthetic, VAK [11], [12].

Visual learners need to see the teacher's body language and facial expression to interactive whiteboards and hand-outs. During a lesson, learners often prefer to take detailed notes to absorb the information. They prefer sitting at the front of the classroom, and they learn best from visual displays including: diagrams, illustrated, videos and flipcharts [13].

Auditory learners however prefer learning through verbal discussions and lessons. They can interpret the implicit meanings of speech through voice. Moreover, they usually benefit from reading [13].

The third style, kinesthetic learners, often learn best through activities and the physical world around them; thus, it is hard for them to sit for long time and may be distracted by their need for exploration [13]. Table I describes these learning modalities.

TABLE I
 DESCRIPTIONS OF LEARNING MODALITIES

Visual	Kinesthetic	Auditory
Picture	Gestures	Listening
Shape	Body movements	Rhythms
Sculpture	Object manipulation	Tone

II. METHOD

The test is divided into three main parts, each one evaluates a side: the first part measures the type of learning, the second part measures the social and physiological skills and the last one measures the performance of students.

The first part was prepared by the researchers to evaluate the social and physiological which is important for being a successful teacher. This part consists of 27 questions each one has five choice describing the degree of agreement. These statements are:

1. I can establish successful relationships with others.
2. I co-operate with my colleagues to finish the work required.
3. Take the lead in the positions of group discussions.
4. I deal without any concern with strangers.
5. I prefer to engage in serious discussions to clarify my opinion.
6. I enjoy establishing good relationships with others.
7. I would like to make dialogues and discussions with those around me.
8. I deal well with the opposite gender.

9. I enjoy spending time with the children.
10. I deal with other people with an emotional poise.
11. I took most of the decisions carefully and after a study.
12. I have the ability to influence those around me.
13. I endure at work until completion.
14. I have self-control in the provocative situations.
15. I feel reassured constant in all cases.
16. I continue doing routine businesses until completion.
17. I can work according to a structured and consistent agenda.
18. I accept the values and customs of the society.
19. I respect my profession as a kindergarten teacher and appreciate it.
20. I am proud of belonging to the future career as a teacher.
21. I am working on strengthening the religious spirit in the hearts of those around me.
22. I deal well to make myself a role model.
23. I am sincere in my work no matter how it is simple.
24. I characterized by fairness in evaluating of the actions of those around me.
25. I respect the feelings of other people and their holy places and rituals.
26. I avoid fanaticism and appreciate differences in opinions.
27. My say is consistent with my work.

These questions have been provided to 13 experts and the results are presented in Table II. The second part is applying the VAK test which determines the learning style of the learners. These two parts are converted into an electronic test.

During the exploratory experiment, the researchers discovered that electronic measurement is not enough to measure the student's abilities. Therefore, two basic dimensions were added to the scale, one is performance and the other is a set of situations that measure the student's ability to deal with the problems that they might meet.

1. Measure the students' height.
2. Measure the students' weight.

Performance dimension:

1. Compatibility:
 - The student hears a certain rhythm and has to imitate it by clapping their hands.
 - The student hears a specific rhythm and performs steps in line with rhythm.
2. Speed:
 - Running in place with music.
 - Jump in place with clapping.
3. Force:
 - Exchanging standing and sitting for 15 seconds.
 - Push the wall with arms. and touch the wall by chest for 15 seconds.
4. Flexibility:
 - Exchanging opening and closing the arms and legs in time to the music.
 - Swing arms in front and behind.

III. RESULTS AND DISCUSSION

The test has been conducted on 1,100 students during the admission system of the academic year 2016/2017. After

analyzing the results, it is found that more than 65% of the students have are auditory learning style. The results of applying the test are shown in Table III. Additionally, almost 97% of all applicants have the minimum requirement skills for teaching children.

TABLE II
THE EXPERTS RESPONSE TO THE QUESTIONNAIRE

Item	The agreement percentage
1 I can establish successful relationships with others.	100%
2 I co-operate with my colleagues to finish the work required.	100%
3 Take the lead in the positions of group discussions.	85%
4 I deal without any concern with strangers.	66%
5 I prefer to engage in serious discussions to clarify my opinion.	100%
6 I enjoy establishing good relationships with others.	84%
7 I would like to make dialogues and discussions with those around me.	91%
8 I deal well with the opposite gender.	78%
9 I enjoy spending time with the children.	100%
10 I deal with other people with an emotional poise.	92%
11 I took most of the decisions carefully and after a study.	100%
12 I have the ability to influence those around me.	81%
13 I endure at work until completion.	59%
14 I have self-control in the provocative situations.	89%
15 I feel reassured constant in all cases.	74%
16 I continue doing routine businesses until completion.	83%
17 I can work according to a structured and consistent agenda.	100%
18 I accept the values and customs of society.	100%
19 I respect my profession as a kindergarten teacher and appreciate it.	100%
20 I am proud of belonging to the future career as a teacher.	100%
21 I am working on strengthening the religious spirit in the hearts of those around me.	70%
22 I deal well to make myself a role model.	100%
23 I am sincere in my work no matter how it is simple.	100%
24 I characterized by fairness in evaluating of the actions of those around me.	100%
25 I respect the feelings of other people and their holy places and rituals.	100%
26 I avoid fanaticism and appreciate differences in opinions.	100%
27 My say is consistent with my work.	100%

TABLE III
THE RESULTS OF APPLING VAK TEST

Item	percentage
1 Auditory	65.6%
2 Visual	22.3%
3 Kinesthetic	14.1%

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