

# E-Portfolio to Assess the 21<sup>st</sup> Century Skills of Students in Smart E-Learning Environment

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Received 28/8/2019

Accepted 4/2/2020

## Abstract:

In the digital age, the interaction between the ICT and the educational system has led to fundamental transformations and changes to all elements of the learning process. Intelligent devices have enabled the learner to access knowledge resources at any time and anywhere. Learning management systems have produced a smart E-learning environment which enables active learning, Communication, and interaction among users. Quality Assurance in Higher Education has become urgent and aspires to qualify graduates who have mastered diverse and varied skills appropriate with the digital age. The academic programs requisite to rely upon the evaluation of learning outcomes, not only cognitive but also skills, thus the modification of the current assessment system is demanded.

This study identified the 21<sup>st</sup> century skills and performance of learners in five categories: Critical Thinking Skills, Problem Solving Skills, Digital Communication & Sharing Skills, the Productivity of Creative Innovation Skills, and Self Regulated Learning & Career Skills. While Higher education is required to provide evidence of student learning skills, the study suggests E-Portfolios, which are considered as a tool that allows the student to: organize, save, document, publish, and digitally share his work as an accurate assessment tool. The study discusses the foundations, principles, objectives, and analyzes the application of E-Portfolio as a learning and assessment tool of 21<sup>st</sup> century skills in higher education.

**Keywords:** E –Portfolio, 21<sup>st</sup> century skill, Quality of smart E-Learning.

## Introduction:

No doubt that transformations and changes in the philosophy and systems of university education follow several types of information, communication and technology (ICT) revolutions in the 21<sup>st</sup> century. Traditional learning has transformed into intelligent E-learning, opening up the learner's horizons of knowledge and technology at exceptional levels to meet the expectations of educational institutions in preparing qualified human resources, and specialized technical staff equipped with differentiated quality skills and performance that meet the needs of a society optimisms to prepare a generation capable of making change for the better future, rather than adapting with it.

Therefore the greatest beneficiary of the transformations that resulted from the integration of ICT with the educational system is the human element, especially the learner, who is the focus of the smart E-learning environment, which in turn fulfills growing demands. The use of information technology and the storage, production, and

participation of knowledge are essential in the 21<sup>st</sup> century<sup>(35)</sup>.

Moreover, Jonasen et al. noted that "advanced teachers and technology play an indirect role in learning, which can stimulate and support activities that involve learners in thinking, which can result in learning." But learners do not learn directly from Technology used to support learning if employed as tools and the intellectual partner helps the learner to think<sup>(4)</sup>.

Hence, there is a need for a common understanding of the purposes and use of E-Portfolios in higher education, which is designed to rehabilitate professionals with skills that should increase with the amplification of knowledge in the digital age; this is why E-portfolio is developmental in nature, to show the levels of individual progress in learning overtime periods at the same time as the school calendar<sup>(12)</sup>.

According to the Quality Assurance requirements, there is an urgent need for an objective evaluation tool that will enable the teacher to carry out a continuous, objective and accurate assessment

of performance and skills, and can be relied upon to evaluate performance according to quality standards. As well as the achievement of the principle of integration between measurement tools, where the E-portfolio is concerned with assessing all aspects of the learner with several tools included in the file. In addition to the need to involve specialists to ensure quality both inside and outside the educational institution in the process of impartial and objective evaluation. It also provides an opportunity for improved performance and adaptability, and it contributes to the development of personal skills and experiences of both the teacher and the learner<sup>(31)</sup>.

### **The Study Problem:**

However, Higher education is required to afford benchmark for student learning skills and apply a continuous assessment method to assess them, from the analysis of educational literature and previous studies, it is noted that there is a gap in updating the assessment tools of students learning outcomes in the modern age, while the problem with many traditional systems, which used limited methods in educational assessment, may be unlogic within the advanced systems; that have been realized still using traditional assessment methods to assess student skills and performance, hence the study suppose it is unsuitable in smart systems to use traditional ways, whereas many educators call for the renewal of the learning outcomes and the assessment tools required to assess them.

The study aims to detect 21<sup>st</sup> century skills, and proposes to use E-Portfolio as a learning and assessment tool for student skills, as well as set the foundation, the principles and objectives of E-Portfolio, and how it could be used to assess 21<sup>st</sup> century skills to ensure the quality of higher education.

### **The Study Questions:**

How could the E-Portfolio be used to assess the 21<sup>st</sup> century skills for students?

The following questions are divided:

1. What are the 21<sup>st</sup> century skills required in higher education?
2. What is the importance of E-Portfolio in smart E-Learning environment?
3. What is the role of E-Portfolio in assessing the 21<sup>st</sup> century skills?

### **Objective:**

The study intends to identify the following objectives:

1. The 21<sup>st</sup> century skills that are required in higher education.
2. The importance of E-Portfolio in smart E-Learning environment.
3. The role of E-Portfolio in assessing the 21<sup>st</sup> century skills.

### **Method:**

The Qualitative research technique is applied to answer the questions, by analyzing the literature and surveying the field of the study.

### **To Answer the Questions from Analyzed the Literatures:**

#### **1. What are the 21<sup>st</sup> Century Skills Required in Higher Education?**

Higher education is considered as the leader of development in society, hence it seeks to qualify the learners to master the multiple and different skills, which allow them to think, communicate, and manage the knowledge. It is clear now that the learner, as the focus of the learning process, must change the way he studies and learns in order to acquire the skills of the 21<sup>st</sup> century, which is not provided by traditional learning<sup>(9)</sup>. Miller<sup>(28)</sup> supposes that it is needed to develop and employ various evaluation tools instead of the traditional evaluation ones for assessing the learning skills and performance.

Mahdy<sup>(25)</sup> summed up the 21<sup>st</sup> century skills in: problem solving, innovation and creativity skills, teamwork and leadership skills, communication skills, communication and information skills, computing and ICT skills, professional skills and self-regulated learning.

The present study adopts five skills: Critical Thinking Skills, Problem Solving Skills, Digital Communication & Sharing Skills, the Productivity of Creative Innovation Skills, and Self-regulated Learning & Career Skills.

Quality Assurance in Higher Education, is considered one of the main reasons for paying attention to E-portfolio: hence the academic programs should adopt an evaluation of the learning outcomes of skills and performance and not only knowledge, as well as the need to introduce ICT into the educational aspects and rely on the way students are supported with skills based on structural and social constructivist theory<sup>(21)</sup>. This inevitably led to the modification of the current evaluation system, based on verification of the extent to which the knowledge provided by students was acquired, and replace them with advanced methods, including the use of E-Portfolios as a tool that combines the building of the learner to know himself and choose the appropriate methodology for the organization and presentation, and then self-evaluation, as well as participation to allow peer assessment of each other, and Farahany<sup>(16)</sup> recommends preparing students to use E -Portfolio as a tool of education and evaluation.

#### **2. What is the Importance of E-Portfolio in Smart E-Learning Environment?**

E-Portfolios is an alternative assessment method that has been widely used in educational institutions

in many advanced countries, because it is well suited to the purposes of alternative assessment; it focuses on important learning processes that can be developed within the school framework, the need for student learning, and the collection of a wide range of knowledge and skills, where it follows the performance itself, and allows different interests to solve the problems that interest the student, and his critical thinking<sup>(6)</sup>. Therefore, the study of Masoudy<sup>(27)</sup> uses the E-portfolio during the teaching of Al Feqhe, and shows it is effective in the achievement of the first grade secondary students.

E-Portfolio can be defined as "a folder or a record of the selective work of a teacher or learner from lessons, lectures, projects and exercises, where multimedia works in the presentation of these works, whether sound, text, videos, stationery, graphs or presentations. E-portfolio can be published via the Internet or any electronic means<sup>(23)</sup>.

There is a theoretical basis for the E-Portfolio. Under construction, E-Portfolio is a work-centered activity that emphasizes the need to evaluate learning in its course rather than separating the calendar from learning, and not focusing solely on what students have already learned from the knowledge acquired, but also on the tools, and the tools employed by students in learning<sup>(4)</sup>.

The design and preparation of E-portfolio, in essence, is an individual activity. It is the students themselves who decide to identify the learning outcomes they will use to document their learning, the formulas and templates used to design and deliver the essential completion files. However, peers and teachers play an important role in this process; teachers have a role to play in guiding and facilitating their students while students learn a lot from their peers; students may have difficulty completing their learning projects if they do not cooperate with their other peers.

### **3. What is the Role of E-Portfolio in Assessing the 21st Century Skills?**

The 21<sup>st</sup> century skills have been identified in Critical Thinking Skills, Problem Solving Skills, Digital Communication & Sharing Skills, the Productivity of Creative Innovation Skills, and Self-Regulated Learning & Career Skills and a review of several previous studies that support the importance of E-Portfolio.

The study of Abdul-Salam<sup>(1)</sup> shows the importance of E-Portfolios in achieving a number of desired learning outcomes in the digital age, including: increasing the development of the students' technical skills, the ability to show the impact and effectiveness of the use of technology, as well as, documenting the progress of the learner, and motivation associated with learning, self-assessment and educational reflection.

**For Critical Thinking Skills:** E-Portfolios provide the ability to share students' learning experiences to others, and how reflection is important and how students learn. These reflective practices enhance the ability of students to express their knowledge and skills to their peers, teachers and professionals in the future<sup>(8)</sup>. E-Portfolios also help to assess each student's self and develop a future improvement plan<sup>(29)</sup>. Landis<sup>(23)</sup> used E-Portfolios in developing thinking when preparing and designing E-Portfolios at Indiana University by answering questions: why, how? How much success is planned, and what is the role of E-Portfolio in the teaching / learning process?

**For problem-solving and cognitive skills:** Weber<sup>(34)</sup> used E-Portfolios as a practice with a positive impact on meta-knowledge (HIP) and indicated its role in student learning through meditative practice. Ben-Fares<sup>(11)</sup> used the effectiveness of the use of E-portfolio in achievement, the development of problem-solving skills, and the critical thinking in the subject of social studies<sup>(32)</sup>.

**For technical skills:** Barrett<sup>(9)</sup> concludes that education assessment systems based on quantitative assessment of the learner are not sufficient to assess the high-level performance of an individual's educational behavior, and are not appropriate for their abilities and skills, while E-portfolio gives us a new idea and method of assessing performance in the field, E-learning is extensive and measurable. E-Portfolio is not a product itself, but the learning skills that students have gained as a result of their experiences in developing E-portfolio, which include many skills in designing, thinking, communication and participation<sup>(19)</sup>.

**For communication skills,** which are priorities in the present era, engineering professionals and employers attach great importance, but the development and evaluation of such skills in engineering programs is a challenge<sup>(14)</sup>. The Barrot<sup>(10)</sup> study also uses social networking sites to evaluate E-Portfolios for ESL writing skills, and Facebook was used as a platform for electronic completion files to support the writing skills of ESL students.

**For creative skills,** the design and preparation of E-portfolio is an individual activity; it develops productive creative skills. Students themselves decide what learning outcomes they will use to document their learning, and the formulas and templates used to design and deliver the required E-portfolio. The study of Ibn Zayed & Al Masfer<sup>(18)</sup> has demonstrated the impact of the use of E-portfolio in the development of some innovative thinking skills<sup>(5)</sup>.

**As for the skills of the carrier,** Guo<sup>(17)</sup> notes that because E-portfolios contain performance

models and learners' activity, E-portfolios are used as a source of evidence related to skills or knowledge and pre-graduates' concepts. Thus the work market is based on data on the quality of their E-Portfolios<sup>(31)</sup>.

For specialized skills, E-portfolios have been used as a highly useful assessment tool for students in developing clinical skills to encourage self-reflection and theoretical knowledge by students who identify strengths and gaps in their knowledge<sup>(26)</sup>. The Al Adi<sup>(3)</sup> study, E-Portfolio, has also been used to train students in engineering disciplines to write professional articles.

**As for the teaching skills**, there is a need to harmonize the principles and theoretical expectations of E-Portfolios and their compatibility with current practices, so Carl<sup>(13)</sup> examined the assessment of students during field training at the College of Teachers at the University of South Africa in their E-Portfolio design skills. Ahmed<sup>(2)</sup> used E-Portfolio to help student teachers to Solve English Teaching Practicum Problems in Ala'riesh Faculty of Education, where Al-Qarny<sup>(7)</sup> aimed to train secondary school teachers in the cognitive aspects of the file of electronic achievement, design and production, and the technical aspects of the design and production of the file electronic achievement, similarly, the study of Lulu,<sup>(24)</sup> planned a training program to develop the skills of design and production of E-Portfolio of students in the Faculty of Education.

### Results:

#### The results could be summarized in:

The 21<sup>st</sup> century skills required in higher education:

1. Critical Thinking Skills.
2. Problem Solving Skills.
3. Digital Communication & Sharing Skills.
4. Productivity of creative innovation skills.
5. Self regulated learning & career skills.

#### The objectives of E-Portfolio:

- Supporting and developing various educational skills, to provide the tasks of students using smart technology, which leads to the development of technical skills and communication skills, problem solving skills ... and other 21<sup>st</sup> century skills.
- Utilizing Hypermedia in the E-learning environment, especially the smart phones that have become accessible to students, enables them to take advantage of high-tech to make their interactive presentations.
- Providing evidence for learning outcomes, not just personal pages for students, but contain models and hyperlinks that provide practical examples of student learning outcomes, especially skills and emotions.

- Self-evaluation and peer evaluation: encourage students to participate in the evaluation processes as a push to revise and review their work.
- Meditation: Reflection encourages students to reflect on their efforts and contributions to learning and the reasons for their choice of specific learning outcomes to include them in their files.
- Organization flexibility: Due to its electronic nature: it can organize its contents using several methods while taking advantage of the navigation hyperlinks that connect the ideas and learning outcomes.
- Psychological benefits: Helps satisfy the need to highlight the self and prove the personality and presentation of their own progress and abilities and record their achievements.

#### The Benefits of E-Portfolio:

- Emphasizes the concept of assessment as the learning process is not isolated.
- Provides the student with immediate feedback through an electronic tool.
- Enhances multidimensional scaling rather than a single dimension as in conventional assessment tools.
- Involvement of the learner in self-assessment through the learner's view of the weaknesses and strength by assessing the performance.
- A means of interaction between the student and the teacher and between the student and the rest of the students, in the activation of Peer-assessment.
- Promotes the principle of continuous evaluation of the student is an effective evaluation tool (constructive/final).
- One of the methods of reflection and reflective thinking of the student, which allows him to reflect on his work and progress.
- A documented reference to the student Proof of Learning and the window of his work and efforts is effective to communicate with students, parents, and teachers.
- Learners view the selection of activities that are added to the file which helps in the detection of creative talent and creativity for each student.
- Develop students' responsibility for high-level skills, decision-making ability, dedication to work, and proficiency.
- Develops students' thinking skills such as thinking about thinking, meta-cognition thinking, creative and critical thinking skills, and problem-solving skills.

### It Could Be Summarized That:

From the analysis of educational literature and previous studies, it is noted that, despite the absence of a study confirming the role of E-Portfolio in assessing the skills of the 21<sup>st</sup> century, the results indicate the importance of the role of E-Portfolio in assessing each of the skills of 21<sup>st</sup> century separately, which may support the idea of the current study in the proposal of E-Portfolio as an assessment tool of the 21<sup>st</sup> century skills, especially with the spread of smart E-learning environments, and the current study presents proposed goals and importance of E-Portfolio, which help the next studies to apply.

### Discussion:

The study concludes that one of the explanations for the use of E-Portfolio in assessing performance and skills, is the lack of assessment tools that focus on the cognitive aspect in evaluating the learning outcomes of the skill and emotion. Criticism of test-based measurement tools where the learner feels that the assessment by the teacher is subjective and illogical. In an E-learning environment, and learners with high technical skills, there is a need to replace traditional learning and evaluation methods with an interactive one. It is very difficult for students to document their work, activities, and learning outcomes throughout the study period. The weakness of the accumulated experience accumulated by students as a result of the various assignments and activities they undertake during the study and to benefit from them in the profession. In addition to the development of teaching techniques, it is easy to preserve and document the work of the student and teacher.

A number of factors associated with the importance of educational changes in higher education contribute to the use of E-portfolios, where student-centered learning experiences and more active learning experiences are encouraged<sup>(20)</sup>. E-Portfolios on platforms that provide opportunities for documentation and dissemination, as well as access to different educational needs; and thus face increasing pressures on higher education institutions to provide evidence of the skills and competencies acquired by students in the 21<sup>st</sup> century<sup>(15)</sup>.

### Conclusion:

The use of E-portfolio achieves the aspiration of higher education quality to evaluate learning outcomes and student performance as a measurable reference to the 21<sup>st</sup> century skills gained from the experiences of students with technical skills in a smart e-learning environment that allows students to communicate with colleagues, parents, teachers and professionals in the future; the study recommends using it instead of traditional assessment methods to

assess student performance to ensure the quality of higher education.

### Study Recommendations:

The present study suggests that it is essential to use E-Portfolio as a learning and evaluation tool to support those skills in a smart learning environment that allows them to design and organize their own E-Portfolio to share and learn with peers.

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# ملفات الإنجاز الإلكترونية لتقييم مهارات القرن الحادي والعشرين للطلاب في بيئة التعلم الإلكتروني الذكية

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قبول البحث 2020/ 2 /4

استلام البحث 2019/ 8/ 28

## الملخص:

لقد أدى التفاعل بين تكنولوجيا المعلومات والاتصالات والنظام التعليمي في العصر الرقمي إلى تحولات وتغييرات أساسية في جميع عناصر عملية التعلم، كما مكّنت الأجهزة الذكية المتعلم من الوصول إلى موارد المعرفة في أي وقت وفي أي مكان. وتبعاً أنتجت أنظمة إدارة التعلم بيئة تعليمية إلكترونية ذكية تتيح التعلم الفعال والتواصل والتفاعل بين المستخدمين. في الوقت الذي أصبحت الجودة في التعليم العالي أملاً عاجلاً في تأهيل الخريجين الذين أتقنوا مهارات متنوعة تتناسب مع العصر الرقمي، واعتمدت البرامج الأكاديمية المطلوبة للاعتماد على تقييم نتائج التعلم، ليس فقط المهارات المعرفية ولكن أيضاً مهارات المستقبل بشكل خاص، وبالتالي ظهرت الحاجة لتعديل نظام التقييم الحالي. حددت هذه الدراسة مهارات وأداء المتعلمين في القرن الحادي والعشرين في خمس فئات: مهارات التفكير النقدي، ومهارات حل المشكلات، ومهارات الاتصال والمشاركة الرقمية، والمهارات إنتاجية التفكير الابتكاري، ومهارات التعلم الموجه ذاتياً والمهنية. في حين أن التعليم العالي أصبح مطالباً بتقديم دليل على مهارات تعلم الطلاب، فإن الدراسة اقترحت استخدام ملفات الإنجاز الإلكترونية كأداة تتيح للطلاب القيام بما يلي: تنظيم أعماله وحفظها، وتوثيقها ونشرها، ومشاركتها الرقمية كأداة تقييم دقيقة. ناقشت الدراسة الأسس والمبادئ والأهداف وحلت واقع تطبيق ملفات الإنجاز الإلكترونية كأداة للتعلم والتقييم لمهارات القرن الحادي والعشرين في التعليم العالي كما قدمت توصيات لتفعيل ذلك في بيئة التعلم الإلكتروني الذكي.

**الكلمات المفتاحية:** ملفات الإنجاز الإلكترونية – مهارات القرن الحادي والعشرين – الجودة في التعليم الإلكتروني الذكي.