

The Use of E-Portfolio to Develop Student's Self-reflection in Pre-school

The case of a Private Saida (Lebanon) High School

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Abstract—This study presents electronic portfolio (E-portfolio) as a tool for reflection, and appraises in great depth its impact on students' metacognition. The suggested simulation was empirically examined by investigating the nature, and composition of its framework using descriptive evidence from 24 participants of students in pre-school along with their parents and 36 preschool teachers, 4 admission people and 1 learning support assistant. Findings revealed students who used E-portfolio as tool of reflection had experienced a deeper understanding in learning by the action of realizing the point of strength and areas of improvement that played a role in student's intrinsic motivation. They also showed that digital reflection is more effective in simple decision-making skills than traditional methods.

Keywords- *E-portfolio; interactive learning environment; self-reflection.*

I. INTRODUCTION

As we are moving in time, developing teaching methods, strategies and tools have become a must. An Electronic portfolio (E-portfolio), perhaps one of the latest trends in education, is becoming essential for both teachers and students, since it carries within its pages a preview of the student's or teacher's challenges, strengths, and areas of improvement, and foremost, it is considered a main tool for reflection. For this, including E-portfolios in schools, as a tool for reflection became something that Houssam Edeen Hariri High School (HHHS) is seeking to have to accomplish their vision, mission and goals.

In an overview of the school, HHHS is a private school that follows a holistic learning program, and places significant efforts in recruiting highly qualified teaching staff. It has been accredited as a Primary Years Program (PYP) in Saida, Lebanon. Since the topic of E-portfolio for students at schools is still gaining momentum and in the process of development in Lebanese schools, there is a need to investigate more about the relation between E-portfolio and self-reflection to find its efficacy. This study aims to analyze the impact of the use of E-Portfolio to develop student's self-reflection in early years in the above-mentioned school on the process of changes from traditional to E-portfolio. The rest of this paper is organized as follows. Section II presents a review of related literature about self-reflection and E-portfolio in schools. Section III describes the methodology of the study. Section IV provides the results of the study, and the analyses of the results. Section V

proposes recommendations based on the findings of the study. The acknowledgement and conclusions close the article.

II. LITERATURE REVIEW

A review of self-reflection in the light of technology will be presented, and the following will be included: (1) definition of technology, portfolio as a mean of self-reflection and E-portfolio, (2) process of change into technology, (3) Theory of Connectivism, (4) summary. There are many types as of portfolios: Showcase, cumulative, goal based, process, active, evaluation, electronic, and mini portfolios. Many facilitators find the portfolio an accurate tool for assessing students especially those with disabilities since it shows the learning progress for each student. Portfolios also give students the opportunity to watch their progress and reflect on it, for example a learner would write "in this page you can find my areas of strength or the areas I need to improve." This involves learners in the process of evaluating their progress [1].

Other researchers suggested that traditional portfolios are not reflective of disabilities, and E-portfolios are way easier for all types of students equally [2]. E-portfolios allow the process of self-reflection to be more efficient. Using animations in E-portfolios has a significant effect in the process of self-reflection. Use of animations together with assessment methods and techniques will result in having the students actively participating in the process evaluation [3]. Also, it engages students and motivates them to use online communication tools [4]. Providing game-based learning engages the learners in an interactive-authentic problem-solving situation that provides enjoyable and motivating learning experiences [5].

Connectivism mentions learning as the ability to construct networks among education [6]. It is focused on connecting with people in a network in order to share experiences and specialized knowledge [6]. To support this process, current education has the goal of combining two effective tools that are meant by this change. The first tool is using Web 3.0 technologies for the learning platform in order to create user-centered learning and people [1]. The second tool is using well-defined website that is concerned in education objectives and outcomes between materials [8]. When using both tools, Connectivists will deliver communication networks consisting of experts for direct help and communication among learners.

The challenge of such an approach is revealed by the evaluation of the effectiveness of this tool in the light of change [8].

In summary, considering the elements for change, the future effective goals, and the learners in the educational institution who need this reflection, the school will be able to achieve the expected success. Thus, checking the current situation for the school and checking on students', teachers' and parents' needs and capacities will help on knowing how to move accordingly in less time that results in efficient change.

III. METHODOLOGY

The methodology is utilized to check the effectiveness of E-portfolios as intervention or enhancement instrument in pre classes at private school at KG2 classroom in Lebanon.

A. Research Design

The study applied an experimental design. Reference [9], "in an experiment the investigator controls the application of the treatment". The experimental strategy permitted examination of the effectiveness and impact of using E-portfolio to enhance the students' self-reflection skills knowing that self-reflection is an important key concept according to the PYP and in the enhanced PYP self-reflection must be integrated into all units of inquiry. The dependent variable in this study is: Utilizing E-portfolio as an intervention to prove students' self reflection at pre-school and develop reflection skills at this age. However, the independent variables are: education goal, social learning and environment, students' perception toward instruction, and evaluation. In this design, triangulation method offers the integration matter [8]. A descriptive quantitative research design was used.

B. Sample Size and Population

The target population of the current study contained students at pre-school, in a private school in KG2C (3-4 years old) from HHHS. One hundred fifteen participants were involved in the study (twenty four students, forty eight parents, forty one teachers, one learning support assistants and two school principals).

The selected sample of study followed the stratified random sampling technique. Stratified random sampling is suitable methodology in order to make balanced, meaningful, comparisons between sub-groups in the population [10].

C. Data Collection Tools

In this study, the researcher prepared questionnaire to be filled by students, principals, teachers and parents investigating their perceptions. The researcher used questionnaire for teachers examining effectiveness of using E-portfolio as a teaching method in KG2 based and taken from the International Journal of E-portfolio. The questionnaire is divided into two sections. The first section consists of 8 questions about the impact of digital portfolio on teachers, spread among 5 action scale with numerical value for each answer as 1= Developing, 2= Basic, 3= Satisfactory, 4= Efficient, and 5= Proficient. The second

section consists of 6 questions that form a reflection for teachers about the impact of E-portfolio on the process of teaching and learning, the teachers and learning support assistant are asked to choose between yes and no. This questionnaire helped in targeting the main points that the researcher has to focus on and made data collection process go smoother.

Unlike teachers and learning support assistants' questionnaire, the students' questionnaire is made up of scale divided into 4 levels by which students will reflect on their journey of using E-portfolio derived from Marzano Scale on Teachers Pay Teachers website. This questionnaire was based on visuals which made learners engaged in the self-assessment process.

As for parents, they are asked to fill a questionnaire that the school always asks them to fill after each student led-conference.

All statistical analyses were carried out using the Microsoft Excel. The analyses that were examined in the study included: (1) Frequency Analysis to analyze the number of participants; (2) Descriptive Analysis to analyze the perceptions of participants towards the use of E-portfolios and its effects on self-reflection and metacognition.

The questionnaires selected were depending on how much each question is relevant to the case study itself and how much it reflects each teacher's, parents' and student's concerns when thinking about technology and E-portfolio.

IV. RESULTS AND DISCUSSION

This section introduces data analysis. It analyzes teachers' questionnaires that show their perceptions regarding the impact of digital portfolios on their teachings and on students as well. Moreover, it analyzes parents' questionnaires concerning their children learning, and it analyzes students' questionnaires to assess their perceived self-reflection. Afterward, the research questions and hypotheses are shown to correlate with the effectiveness of the E-portfolio in enhancing students' reflection skills. Finally, correlations between results and two UN Sustainable Development Goals (SDGs): Goal 4 (Quality Education) and Goal 13 (Climate Action) are discussed [11].

A. Results of Teachers' Questionnaires

When teachers developed their own digital portfolios, they learned more about efficiently using technology, rethought of their existing teaching practices, and enhanced their lesson planning. In addition, teachers gained the ability to teach their students how to create a digital portfolio. The use of technology by students was a new interesting experience for them. This result demonstrates a shift in pedagogical practice through incorporating technology to a higher degree and enhancing teachers' practices in having more timely communications with their students. The creation of digital portfolios engaged both teachers and students in a give-and-take process of learning.

These results significantly indicate that teachers were able to express the efficient and motivational use of digital portfolios on students learning, academic standards, self-assessment, and reflection skills. Also, our findings demonstrate that the development of digital portfolios by teachers positively impacted their students' way and amount of learning as well as their relation with them.

TABLE I. RESULTS OF TEACHERS' QUESTIONNAIRE

Criteria	Scale				
	1	2	3	4	5
Knowledge about digital portfolios	0%	4.9%	58.5%	24.4%	12.2%
Ability to create and use a digital portfolio	26.8%	24.4%	48.8%	0%	0%
Ability to teach your students how to create a digital portfolio	12.2%	63.4%	22%	2.4%	0%
Ability to use and integrate technology	0	24.4%	36.6%	36.6%	2.4%
Attitude towards using technology in the classroom	0	12.2%	12.2%	73.2%	2.4%
Collaboration with other teachers in or outside your school in the use of educational technology	0	0	0	0	100%
Ability to coach/ support colleagues in the use of educational technology	0	12.2%	36.6%	48.8%	2.4%

The relation between students and teachers is very critical since it is part of the reflection process that teachers use in order to guide curriculum and to assess individual and group understanding of concepts.

TABLE II. RESULTS OF PARENTS' QUESTIONNAIRE

Questions	Yes		No	
	Frequency	%	Frequency	%
Did using a digital portfolio with your son/daughter reflect more knowledge on their taught materials?	38	79.2%	10	20.8%
Did using a digital portfolio reflect how much your students learned?	40	83.3%	8	16.4%
Do you think your son/daughter learned academic content standards differently through reflecting while using digital portfolios?	38	79.2%	10	20.8%
Was using digital portfolios with your son/daughter important?	41	85.4%	7	14.6%





Upon comparing parents' answers to teachers' answers of the same set of questions, it can be noticed that their answers were approximately matching. Hence, these results validated how the use of technology in digital portfolio made parent engagement efforts even more effective.

Digital portfolios have been shown to push updates to parents rather than expecting them to check, and they were also proven to connect parents with what is actually happening in the classroom. This clearly emphasizes the positive impact of using a digital portfolio with their children on reflecting knowledge and learning.

B. Results of Students' Questionnaire

This is critical as self-reflection process does not only encourage students to think about their own thinking but also help them in developing their ability to know how to think. Portfolios give a mean for the students to monitor their achievements and in turn they become confident and motivated to take risks in the future [12]. Hence, there is a statistically significant relation for E-portfolio on the process of teaching and learning among preschoolers. Also, E-portfolio correlates with students' self-reflection skills like metacognition.

TABLE III. RESULTS OF STUDENTS' QUESTIONNAIRE

Self- reflection	Frequency	%
I know what I am good at very well. I feel like I could talk about it for someone else.  4	1	4.2%
I know my strength points pretty well. I remember every situation right after the question.  3	12	50%
I feel like I am still discovering what I am good at. I still have some questions and am unsure sometimes.  2	8	33.3%
I need to do Lots of tasks to know what do I know and what I don't. I am not sure what to do most of the time.  1	3	12.5%

C. Discussion and Interpretation

Most parents referred to E-portfolios as means of communication with their children in a way that connects home and school more deeply. Parents' perceptions were divided; many parents found using E-portfolio is essential especially that they found how their children were leading in the student led conference and talking about each and every single activity independently. On the other hand, some parents argued the idea of having their children learning through technology with mentioning that it would be harmful of learners at that age. Throughout the survey, most parents reported many benefits of E-portfolios and the strongest benefits included being able to document progress and the promising digital aspect of portfolios in a reflective manner. Most parents also indicated that E-portfolios provided a glimpse into their child's classroom, and they enjoyed the digital features of being able to hear and/or see as part of their perception toward E-portfolios implementation in the class.

As for teachers, their perceptions differed as the researcher is conducting the study; before starting to use the E-portfolio many teachers' responses were negative and they mentioned that it wouldn't affect the learning process for each learner then after applying E-portfolio they found how interactive, reflective and independent the students were and they found out how using E-portfolio reduces time teachers need to prepare and finish students' portfolios so they were motivated to start applying E-portfolios in their classrooms with their students. Foremost, many teachers realized that learners are capable to do self-reflection at that age which made them motivated to start the procedure with their learners.

Data collected from the teachers' questionnaire showed that teachers clearly expressed subjective satisfaction from E-portfolios. A critical theme from teachers was conducting an authentic E-portfolio learning process using "real-life application of their learning" and "watching children take their work seriously". As mentioned earlier, the collected data further show that E-portfolios impacted the teaching methods of the involved teachers. One important thing was that the teachers were able to have more insights toward each child through their selection of artifacts and their reflections on their work. Finally, through E-portfolios, teachers were able to have a strong view of children as capable learners whereby they described students as protagonists who have high engagement, reflection and ownership. Obviously, teachers viewed the creation and use of E-portfolios as positive teaching tools for their students and themselves.

Learners were extremely excited; they asked about every single detail concerning their E-portfolio and they were responsible to show the best image about each learner's profile in his/her E-portfolio. Implementing E-portfolio for students was a privilege that motivated the students in the process of learning and teaching. In addition, students showed a deeper thinking concerning the provided content and themselves as learners. In particular, this finding is helpful because most empirical studies are limited to students at elementary schools rather than preschoolers.

Overall, students, teachers and parents expressed subjective satisfaction to the use of E-portfolios. Hence, most parents, teachers, and students found E-portfolios effective for reflection.

These results allowed the researcher to accept the following hypothesis:

- H_{A1} : There is a statistically significant relation for E-portfolio on the process of teaching and learning among preschoolers.
- $HA2$: E-portfolio correlate with students' self-reflection skills like metacognition.
- Parents, teachers, and students find E-portfolio effective for reflection.

Correlation between Results and the UN Sustainable Development Goals (SDGs), The UN Sustainable Development Goals (SDGs) are considered as blueprints that lead to better achievements and more sustainable future for everyone.

Two major SDGs that could be related to the current study are goals 4 and 13 as discussed below:

- Goal 4 "Quality Education" [11]: Our findings reveal that children at HHHS are receiving a well-qualified care and pre-primary education that develops their deep understanding about subject. Moreover, they learn how to reflect upon their learning experiences and progress which increases their self-confidence, responsibility and metacognition.
- Goal 13 "Climate Action" [11]: Since every single and even the smallest action can make a difference and lead to a change, we decided to undertake a correlation between the creation and use of digital portfolios and this SDG. Using digital portfolios will reduce the use of papers, and thus their production and their unfavorable effects on the environment.

V. CONCLUSIONS AND RECOMMENDATIONS

The major focus of this study is to enhance the learning process in a digital context that requires new tools and methods, and E-portfolio is one of them. The current study discussed the potentials and merits of using digital portfolios. It is concluded that digital portfolios act as potent tools for assessing students' work and progression, structuring learning and teaching processes, enhancing communication and collaboration, sharing experiences and resources, and finally for supporting the self-reflection and metacognition of students. Moreover, the use of E-portfolios led to an enhanced quality of teaching, played a key role toward a sustainable development, reduced the use of papers, their production and their unfavorable effects on the environment, which correlates with the sustainable development goal that combats climate change and its impacts. Moreover, the use of digital portfolios helps in overcoming the technical problems associated with storing and accessing information while creating hardcopy portfolios.

A. Recommendations

Based on the review of the literature and the obtained findings of the current study, the accompanying pedagogical recommendations on some critical issues are suggested for future studies in order to bridge the existing research gaps:

a) More training and integration of activities regarding structural reflection, social interaction, and self-awareness could be involved in E-learning materials in order to increase students' performance in self-monitor, self-modification, and self-evaluation.

b) Urge teachers to begin with introducing metacognitive strategies into the classroom .

c) Embed E-portfolios as "long-term professional development tools" for both inservice and preservice teachers are recommended.

d) Both private and public education departments should ensure the implementation of these tools within the teaching and learning processes.

e) Increase the time apportioned in class for the use of E-portfolios and some sort of re-organization could be done to enable this new teaching method to take up enough time in the class

f) Future research should examine and assess the differences between male and female students toward self-reflection and metacognition.

g) Articulate the concept of self-reflection and metacognition and encourage them among our students via E-portfolios. Ongoing efforts must ensure a sustainable dedication to effectively integrate E-portfolios to enhance student learning.

B. Limitations

This study suffers from some limitations. First, the sample was limited to only one school (115 participants: 24 students, 48 parents, 41 teachers, 1 learning support assistants, and 2 school principals). Thus, different results might be obtained if more teachers from different grade levels, schools, and areas were involved and studied. Secondly, our data is represented in the form of quantitative measures and relies only on descriptive statistics, which cannot confirm any statistical significance between data. In addition, the study sets self-report data, which is a type of data that in spite of speaking to the teachers' and parents' perceptions as participants, there was a limitation regarding the reliability of the collected data. It is also essential to report that the participants' perceptions may be subjected to internal bias due to several factors. However, obtaining similar findings from teachers, parents and students minimizes the possibility of having unreliable data.

C. Implications for Further Study in Lebanon

There is an absence of similar studies in Lebanon and a deficiency in other Arab countries, which have close pedagogical environment. It was also noted that the implementation of E-portfolios was more concentrated in universities more than schools. However, there is a possibility of inequitable comparison due to differences in the studied students' educational stages (preschoolers, primary education, secondary education, undergraduate, graduate), and the degree of pedagogical improvement between the other environments and cultures (USA, Malaysia, Taiwan, China, UK, and Turkey). These discrepancies would be better addressed in future research.

REFERENCES

- [1] Barrett, H. "Authentic assessment with electronic portfolios using common software and Web 2.0 tools." www.electronicportfolios.org/web20.html, 2012
- [2] Driessen, E.W., Overeem K., van Tartwijk J., van der Vleuten C.P., and Muijtjens A.M. "Validity of portfolio assessment: which qualities determine ratings?" *Journal of Medical Education*. vol. 40 no.9, pp. 862-6, 2006.
- [3] Lewis, M. A., and Maylor, H. R., "Game playing and operations management education." *International Journal of Production Economics*, vol. 105, pp. 134-149, 2007
- [4] Barbera, E. "Mutual feedback in e-portfolio assessment: An approach to the netfolio system." *British Journal of Educational Technology*, vol. 40, no.2, pp. 342-357, 2009. DOI:10.1111/j.1467-8535.2007.00803.x
- [5] Barzilai, S. and Blau, I., "Scaffolding game-based learning: Impact on learning achievements, perceived learning, and game experiences", *Vol. 70, January 2014*, pp. 65-79, 2014.
- [6] Downes, S., "Resources for distance education worldwide." *International Review of Research in Open and Distance Learning*, 2007.
- [7] Nicolay et al., "International Journal of Industrial Ergonomics", vol. 35, nb. 7, pp. 605-618, 2015
- [8] Feters, M. D., Curry, L. A., and Creswell, J. W., "Achieving integration in mixed methods designs-principles and practices." *Health Services Research*, vol. 48, no. 6, pp. 2134-2156, 2015. doi:10.1111/1475-6773.12117
- [9] Mosteller, F., and Youtz, C. "Quantifying Probabilistic Expressions", *Rejoinder. Statist. Sci.* 5 (1990), no. 1, 32--34. doi:10.1214/ss/1177012251.
- [10] Gay, L.R., "Educational Research: Competencies for Analysis and Application. Columbus", OH: Merrill Publishing Company, 1987.
- [11] Morton, S., Pencheon, D., and Squires, N. "Sustainable Development Goals (SDGs), and their implementation: A national global framework for health, development and equity needs a systems approach at every level." *British Medical Bulletin*, vol. 124, no. 1, pp. 81-90, 2017.
- [12] Bransford, J., Brown, A., and Cocking, R. "How People Learn: Brain, Mind, and Experience & School." Washington, DC: National Academy Press, 2000.