An Integrative Model for the Evaluation of E-portfolios

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Abstract

Electronic portfolios (e-portfolios) are becoming wider utilised by students as vehicles for self-development, self-reflection and self-representation. This study examines the design, implementation and interpretation of a model that may assist in the evaluation of these e-portfolios.

1. Introducing electronic portfolios

Portfolios help to set students apart from the crowd by showcasing their skills and abilities through physical evidence of work and achievements (artifacts). They allow others to gain a deeper and clearer picture of where they have been, where they are now, and where they are going in their chosen career. Portfolios are necessary for lifelong and life-wide learning [1].

Eportfolios are online interactive information management tools that provide the student with greater flexibility in terms of the type of content displayed. Eportfolios present concise, annotated collections of work that record learning, growth and change that may enable students to plan and proceed towards their future goals and enlighten future employers.

2. A theoretical framework

The authors have been engaged in e-portfolio research utilising an e-portfolio evaluation tool that is a refinement of the assessment tool developed by Bhattacharya [2]. Theoretical underpinnings of this tool include activity theory [3], the concept of distributed cognition [4] and the attributes of meaningful learning [5].

In activity theory the unit of analysis is an ‘activity’ that is motivated and directed (mediated) by an object. Each activity is composed of goal-directed actions that must be put into practice in order to fulfill the object. This principle applies to the development of eportfolios which may motivate and direct student activity. Activity theory also parallels eportfolios in terms of self evaluation and assessment for one to look back and question his/her performance and make decisions for the future. Solomon [4] has explored the idea of ‘distributed cognition’. On this view, we ‘distribute’ our cognition into artifacts. This theory supports how we learn from each other and from our environment (tools and technologies) and integrate in our own cognition which is then accessible in our eportfolio.

The attributes of meaningful learning were formulated [5] [6] for designing constructivist learning environments for meaningful learning (see Figure1).

![Figure 1. Attributes of meaningful learning](image)

The argument is that if the learning environment is designed in a way which will support the implementation these theoretical underpinnings then the evaluation matrices and the evaluation tools should be developed to measure the achievements in attributes reflecting this.

3. An integrative model

As a result, a basic single layered e-portfolio evaluation model was developed in 2001 [2] for assessment of students reflection on the process of creating activity-reflection e-portfolios. This was extended to a multi-dimensional layer (Figure 2). The model frames three different activity types as three hexagonal planes (layers). These layers are based on the cognitive apprenticeship model [7].
During Activity 1, students carry out activities in groups supported by a facilitator. In Activity 2, students keep in groups but have minimal facilitator intervention. In Activity 3, students work as individuals engaging in critical thinking and decision making. Each plane consists of six vertices which translate into six evaluation parameters. Each plane is formed by five hexagonal rings, each ring corresponding to a parameter rating - 0 (no achievement) to 5 (excellence).

![Figure 2. Integrative evaluation model](image)

### 4. Implementation of the model

This model was used to evaluate students’ e-portfolios in science and technology and in this study; two evaluation matrices for two students are presented. Figure 3 represents the results for a student most comfortable with working in a group setting whilst Figure 4 the results for a student most comfortable with working as an individual.

![Figure 3. E-portfolio evaluation of student 1](image)

![Figure 4. E-portfolio evaluation of student 2](image)

A quick comparison of the two highlights a major difference between the two students in terms of what parameters occur at what activity layer – and to what rating each parameter attains. Student 1 in Figure 3 experienced a much wider range of parameters (particularly during Activity 3) overall and achieved higher (more positive) parameter ratings.

### 5. Discussion and conclusions

It is evident that Student 1 understood the links between the different activities and provided eportfolio evidence for their learning. Student 2 lacked this evidence – however through critical reflection of these results could immediately identify where to improve in order to pass. Figure 4 also provided an opportunity for facilitators to critically analyse course design for areas of improvement in the case of students like Student 2.

Evaluation of eportfolios using this integrative model ultimately prepares students for the world outside the boundaries of the educational institution.

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### 7. References


