

## A ‘DIGITAL PEDAGOGIES’-BASED LEARNING PLATFORM

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### Abstract

Virtual Learning Environments and Online Learning Platform have been around for some time, yet the problem with the majority of them is that they either attempt to replicate the Face-to-Face equivalent, or are simply development and deployed without a learning model or theory at their basis. In this paper we present a bottom-up development of a learning platform that is entirely based on a sound educational principles that include Ubiquitous learning, Active knowledge making, Multimodal meaning, Recursive feedback, Collaborative intelligence, Metacognition, and Differentiated learning. We will show how this platform has been employed for these last few years and has provided ample data to evaluate the added advantage that digital pedagogies provide especially as the same data is employed through the learning analytics feature that has embellished the platform in this last year. We draw numerous conclusions and recommendation on our experiences as well as on the feedback received from numerous learners and educators that have made good use of the same platform.

**Keywords:** *Digital pedagogies, e-learning, virtual learning environment, ubiquitous learning, learning analytics.*

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### 1. Introduction

The proliferation of online courses is testament to the increased demand and rising awareness of education, as the widespread pervasiveness of information technology in all sectors of our society paved the way for educational institutions to easily and conveniently have access to a wider audience. The effectiveness of e-learning courses has been shown over the years (Russell, 2001; ulHaq, et al., 2018) that there exists no significant difference in learning outcomes when compared to the traditional mode of delivery. However, the distinction between good and bad e-learning has also been outlined by a number of studies (Al-Mahmood & McLoughlin, 2004; Zou, 2006; Connell, 2009), and reported to be no different from the poor and inadequate use of any other medium as a teaching platform. The early e-learning stages focused mainly on transferring face-to-face classes and the familiarization of the instructors with underlying technology which it heavily depends on, and thereby characteristic inefficiencies as well as optimal engagement of the electronic medium tend to be much more dominant, influential, and explicitly discernible. The popularity of e-learning courses and the onset of Massive Open Online Courses (MOOCs) brought about additional issues related to assessment (Admiraal, et al., 2015), critical thinking (Akyüz & Samsa, 2009), and a sense of isolation and detachment (Camilleri, et al., 2013). As a result, the next stage of online learning witnessed a shift in the attention of educators and e-learning specialists from transfer of knowledge to knowledge building and management, seeking to enhance innovative approaches while redefining better processes of learning. This is the case with our online writing and assessment environment, called Scholar, that since 2009 with the support of the Institute of Educational Sciences, the Gates Foundation, and sub-award funding from NSF (Cope & Kalantzis, 2013; Cope, et al., 2013; Olmanson, et al., 2015) we have taken full advantage of new e-learning affordances (Cope & Kalantzis, 2017) to pedagogically design and develop it based on a reflexive ideology whereby complex reasoning skills such as critical and creative thinking form part of the process. Additionally, Computer Science collaborators employed available learning analytics and data mining techniques to automate critical thinking assessment through topic modelling (Zhai, 2008; Kuzi, et al., 2018), as well as semantically analyzing text to assess peer reviews (Zhai, et al., 2004; Shubhra-Kanti, et al., 2018).

In this paper we investigate, propose and implement a learning platform that takes into consideration this new learning approach whereby digital pedagogies disrupt the traditional learning environments and create new affordances that were not possible or available before. This innovative virtual learning platform is entirely based on sound educational principles that include Ubiquitous

learning, Active knowledge making, Multimodal meaning, Recursive feedback, Collaborative intelligence, Metacognition, and Differentiated learning, and has been deployed and adopted by numerous educators at all levels for a number of years. At the University of Malta we have employed this platform for the last couple of years in an effort to collect data and investigate the added advantage that digital pedagogies provide especially as the same data is employed through the learning analytics feature that has embellished the platform in this last year. The rest of the paper is organized as follows. The next section will delve into the benefits of Digital Pedagogies based on Web 2.0 technologies due to their incorporation within the virtual learning platform as part of the empirical study. Section 3 will cover the learning platform itself, from the underlying education principles and theories it is grounded on, to the affordances it enables as a result of the innovative approach. The details of the empirical study are presented in the following section whereby the methodology, participants and results are given in some detail together with an evaluation and discussion of these same results. Finally, we close the paper with numerous conclusions and recommendations drawn from our findings as well as on the feedback received from the participants and educators that have been involved in this study.

## **2. Digital pedagogies**

The WWW evolved over time from a static document repository where users could access documents through their web browsers in a read-only fashion to a read-write environment with dynamic content and possibilities for users to contribute, author and participate. This change to the second generation was not as simple as it seems as numerous other factors played an important role. The web browsers themselves went through a drastic operational evolution to support such a functionality as a struggle between a number of browsers was going on to acclaim absolute control of the web users as increase their revenue. On the other hand, the World-Wide Web Consortium (W3C) were also working hard to ensure that the required standards and protocols are in place. Other technologies that played an important role in the evolution of Web 2.0 was the Semantic Web itself together with the support of the eXtensible Markup Language (XML) that was also striving to destabilize its application and effectiveness. Berners-Lee et al. (2001) set out to define how the new web generation had meaning and thereby set the trend to develop higher-level applications (Hendler, et al., 2002) that could exploit the enhanced capabilities of a smarter web (Frauenfelder, 2001). From an educational point of view Web 2.0 technologies and applications have enabled a novel medium which educators and learners alike can benefit from as such technologies have “blurred the line between producers and consumers of content and has shifted attention from access to information toward access to other people” (Brown & Adler, 2008, p. 18). In this way Web 2.0 empowers educators and learners to communicate and interact in new and natural ways that was not previously possible over the web thereby creating a new educational medium that educators have to rethink and eventually require re-training. The reason behind such reasoning as this novel medium moved the goalposts from students that are receptive to a more interactive and creative. Educators are required to push the boundaries on their students to motivate them to share, comment, post, create, produce, edit and assess other students’ work and contributions. This also helps students gain confidence in themselves as they adopt critical thinking skills as well as useful social skills as they interact with peers, educators, knowledge providers and other web users that will assist them during the education process and life in general. From a practical point of view in reality learners are already making extensive use of Web 2.0 applications in their life outside the educational arena, so employing tools which they are already accustomed to and which they are happy to use is an added advantage to the educational process that facilitates the educator’s life. The challenge here is for the educator to select the most suitable Web 2.0 tool to employ that appropriately fits with the pedagogy being adopted.

## **3. The virtual learning platform**

The current state of online learning portals is still unfortunately conservatively stuck in the didactic pedagogy state of mind whereby the electronic medium is no different from the physical face-to-face environment. Transferring academic programmes from the classroom to their e-learning counterparts is a well-known misconstrued yet highly-followed practice that helped in giving e-learning a bad name and a fair chance of providing sound educational experiences. The trend did improve over the years as e-learning designers, usability experts, and HCI researchers helped enhance and redesign learning portals to reflect learning outcomes rather than academic syllabi. However, three inherent e-learning challenges still remain not fully addressed as online learning portals evolve from ecology to another mainly subject and conditioning by the evolution in the underlying technologies. Formative assessment, high-level intellectual skills, and personalization have proven to be the three weakest spots that have enfeebled the successful and academically sound implementation of e-learning environments.

The ideological basis of the virtual learning environment presented here is based on Benjamin Bloom’s (Bloom, 1968) philosophy on how to aim towards mastery learning, together with our own educational model of new learning affordances [36] (Kalantzis & Cope, 2012) made feasible through new media. Furthermore, from the computing perspective, we employed machine learning techniques to mine and leverage the masses of data gathered through a variety of ways to better understand student learning and use of online learning environments. Now we need to investigate, research and look into how to apply this acquired knowledge and information to address these three challenges and specifically tailor our education expertise and computer science techniques to personalize the entire e-learning experience. The conceptual grounding is based on Cope and Kalantzis (2017) idea of e-learning ecologies that adopt a reflexive ideology that heuristically segments their model into seven “new learning” affordances, namely, ubiquitous learning, active knowledge making, multimodal meaning, recursive feedback, collaborative intelligence, metacognition and differentiated learning. These seven affordances, depicted in Figure 1, represent an “agenda for new learning and assessment” that redefines the relationships between knowledge and learning, recalibrating traditional modes of pedagogies in an effort to create learning ecologies which better suit the educational needs and goals of our time.

Figure 1. The seven e-learning affordances (Cope & Kalantzis, 2013).



The learning platform developed employs Web 2.0 techniques to create a ‘Social Network’ look and feel that take full advantage of available digital pedagogies. For example, it provides ‘updates’ and ‘creator’ apps to complete weekly and term assignments through a system of communities of learners within which learners and educators can communicate, share and create with update areas that partly function as a blog that can include embedded video, audio, data and external links. Another example is one where educators can share course contents, or notify a deadline or an agenda, and for learners to present on chosen and assigned topics, providing comment areas below to facilitate peer-to-peer and student-with-admin discussion. The creator section, for term papers, is a semantic editor and multimodal working space, which goes beyond the word processor. Digital objects, including image, audio, video, text, math, live links, dataset and embedded external media, from YouTube videos to GitHub code, can be all inserted inline within the body of the text.

#### 4. The empirical study

This platform was made available to undergraduate students within the Faculty of ICT at the University of Malta over the last two academic years and quantitative data has been collected through a number of ways both explicit through polls and surveys, but also implicit directly through learning analytics that the same system was designed and developed to collect while the participants are making use of the same platform. Participants were able to compare their traditional experiences using the classical virtual learning environment whereby downloading of content and submission of assignments is allowed together with a thread-based forum area as the only means of communication.

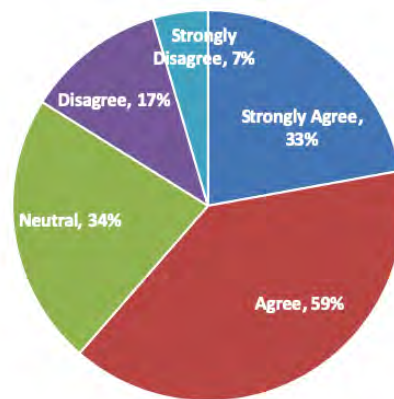
The results obtained, shown in Table 1, indicate a drastic positive preference to an environment that is student-based rather than content-based as the seven affordances highlighted in Section 2 were individually tested to evaluate the effectiveness of this innovative learning platform.

Table 1. Empirical Study Results.

	Strong Agree	Agree	Neutral	Disagree	Strong Disagree	
Ubiquitous	16%	37%	37%	11%	0%	Novel platform promotes use anywhere more than traditional VLE
Knowledge Making	18%	59%	0%	24%	0%	Use of Web2.0 apps assist rather than single summative task
Multimodal	18%	65%	18%	0%	0%	Rich editing environment in new env. better than traditional VLE
Rec.Feedback	31%	31%	13%	19%	6%	Posting updates, comments, favs & sharing helped academically
Collective Int	13%	38%	38%	13%	0%	Comments from the community provided beneficial educational input
Cognitive	25%	56%	19%	0%	0%	An online learning environment should provide access to Dig. Pedagogies
Personalised	38%	38%	13%	13%	0%	Novel platform is more student-centered rather than content-centred VLE

The overall results provided by the participants on the use and adoption of a 'digital pedagogies'-based virtual learning environment are depicted in Figure 2 as they experienced the rich environment through different digital pedagogies that have not only help elevate the quality of the learners' education but facilitated the holistic academic experience.

Figure 2. Overall participants' outlook on the adoption of new learning portal.



## 5. Conclusion

New media offer students the possibility to refine and represent their understandings in multimodal ways, where traditional textual knowledge can be supported by image, diagram, video, visualization, dynamic dataset, and embedded external media. In this paper, we have described a new e-learning environment for added-value experiences whereby new learning affordances are possible through digital pedagogies. Our trials have demonstrated the capacity for students to create a new genre of multimodal work, offering students opportunities to represent their understandings that far exceeds those of traditional tasks. The richness evidenced in their submitted work is statistically measured, as well as their affinity to employ the adequate medium to express whatever they need to transmit to their peers and tutors has also been recorded through the empirical study reported. The learning portal itself represents a number of significant developments in the field of online education and effectiveness of e-learning system as it captures individual and whole cohort progress in learning with a level of granular detail not previously achievable. We strongly recommend that such learning portals are designed and developed bottom-up with the student needs and interests as the main drivers while taking full advantage of digital pedagogies that are freely available online, intuitive, and based on social networks look and feel that learners as well as educators are accustomed to and make use on a daily basis. This research demarcates the beginning of a promising way forward as new research avenues are uncovered characterizing the future of online education and student-centered e-learning platforms while promising to improve and enhance learners' interaction and attitude towards e-learning and online education in general.

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