LESSONS LEARNT FROM AND SUSTAINABILITY OF ADOPTING A PERSONAL LEARNING ENVIRONMENT & NETWORK (PLE&N)

Eric Tsui and Farzad Sabetzadeh
Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University

ABSTRACT

This paper describes the feedback from the configuration and deployment of a Personal Learning Environment & Network (PLE&N) tool to support peer-based social learning for university students and graduates. An extension of an earlier project in which a generic and PLE&N was deployed for all learners, the current PLE&N is a cloud-based learning system that has been customized for groups of learners and support them with active and continuous learning in a blended environment. Major stereotypes of learners were identified based on learners' background, the academic program they enrolled in, and interviews, which together help to identify the learning and career needs of the individuals. Based on the collected information, stereotypes of learners are identified based on common learning and career needs and personal aspirations. Appropriate sets of tools providing support for communications, collaborations, file storage, information alerts etc. are provided to the various types of learners. Trials have been conducted over 3 academic semesters and key factors for enticing participations, contributions and sustained usage of the PLE&N beyond the passing of a semester are also discussed.

KEYWORDS

Personal Learning Environment, Knowledge Management, Social Networking, Social Learning

1. INTRODUCTION

Advancements in the knowledge society has led to massive connections among people, machines and information. Access to the Internet/Cloud is pervasive and ubiquitous. Users are increasingly being empowered with a plethora of tools to conduct knowledge processes e,g, search, store, retrieve, classify, share etc. In the context of learning, individual learners can now configure their own customized set of learning tools and platforms to support their learning activities in a robust way. Therefore, identifying the major stereotypes of learners has a vital rule in delivering the appropriate yet highly personalized content (Cheong & Tsui, 2010). Once such stereotypes are identified, by locating the appropriate tools, data sources and suitable learning content, the fulfillment of the learning requirements and career needs for each type of learners can be properly determined (Drachsler, Hummel, & Koper, 2008; Fiedler & Väljataga, 2011). For example, in general undergraduate students with limited working experience may need a greater support for their learning experience while the part-time post-graduate students may observe such learning needs in the form of career enhancement.

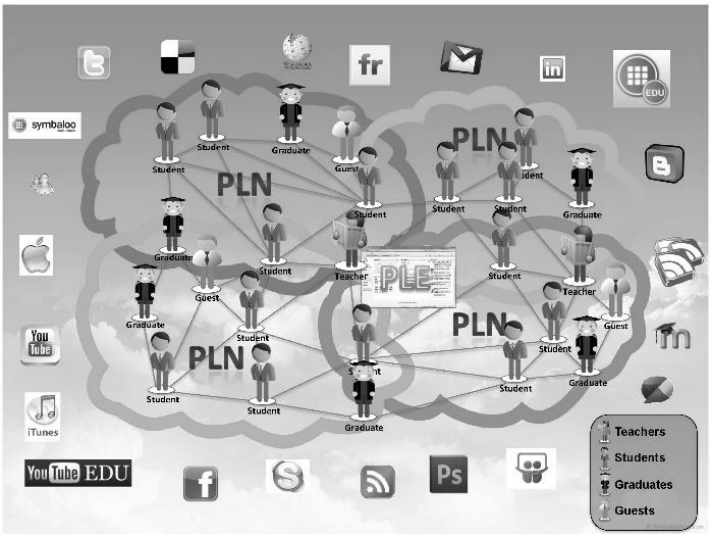

Figure 1. Personal Learning Environment and Networking (PLE&N)

Figure 1. shows a typical PLE&N environment. In this Personal Learning Environment and Networking (PLE&N) project, by determining the student stereotypes through observations and conducting a series of interviews, a prototype system has been developed. This prototype system consists of series of collaborative tools in the cloud environment that enables the students to identify knowledge resources outside of the classroom, annotate and share them with other learners whom include classmates, teacher(s), graduates and other invited professionals (Tsui, Cheong, & Sabetzadeh, 2011). Such external knowledge resources has been used by the students as a validation source for ideas discussed in classes in order to tackle the real world problems based on the taught concepts (Hwang & Chang, 2011; Wang & Wu, 2008; Zimmerman, 2008). Ultimately, in order to evaluate the effectiveness of this prototype system for supporting personal active learning, student feedback has been collected throughout three consecutive semesters (one academic year including summer)(Chou & Liu, 2005; Dabbagh & Kitsantas, 2012; Lee, Cheung, Tsui, & Kwok, 2007). As early as 2011, an earlier but "generic" version of the PLE&N had been deployed to learners by one of the co-authors to his students and substantial feedback and experience have been gained hence leading to this current project which focusses on an advanced version of the PLE&N with "customized pre-configuration" to suit major types of learners.

The PLE&N offers students a personal learning space which they can control. Students can participate and contribute to the PLE&N anytime by posting (with annotations) new articles that they have found, reviewing and commenting on other students' posts, responding to the teacher's requests, and recommending appropriate feeds for a topic of common interest, etc. Furthermore, the PLE&N is customisable and extendable to suit individual students depending on their needs and preferences. As long as a student uses the core set of tools, he/she can supplement his/her PLE&N with additional tools and feeds (see the figure above). This possibility of personalising the learning environment *enables and encourages students to manage their own learning as an independent and inquisitive learner*. The experience of exploring and adopting alternative learning processes (a peer-based, network-based, social connectionist approach to learning) *transforms their mindset* and also *develops their capabilities for life-long learning*.

While much remains to be learnt and fine-tuned, an early evaluation is that this revolutionary approach to learning has been a positive educational experience for students. It is very rewarding to see that the PLE&N has helped students *transcend the boundary of traditional classroom settings* into one that has no physical boundary, offers ubiquitous access, and operates dynamically with networked learners, and at the same time it has helped *transform my students into more independent and inquisitive learners.*

2. METHODOLOGY

Initially, before setting up the PLE&N prototype, a series of interviews were conducted to identify the user's groups and their respective needs. Such preliminary assessment of the students' needs have helped the prototype PLE&N to be fine-tuned (Mupinga, Nora, & Yaw, 2006; Robertson, Line, Jones, & Thomas, 2000). Table 1 shows the interview questions and the purpose of posing the question.

Table 1. The PLE&N Preliminary Survey

Interview Question	Explanation	Interview Question	Explanation
1. What's your background? (Full Time/Part Time Undergraduate or Postgraduate)	Identifying the student type and background	8. If not, why? What other features you would like to have that can help do your group work?	Designed to let students imagine what features in LMS will be useful to their group work.
2. What are your key goals? (e.g. continue to study at a university, switch job, etc.)	The key goals determine the learner's learning and career needs.	9. What tools do you commonly use to complete a group work?	This question is designed to ask students the tools they are currently using to complete a group work
3. Is the university-provided Learning Management system (LMS) adequate for your learning?	This question is designed in order to collect feedback on the university-provided LMS	10. What other tools or features you like to have in a personal learning environment?	To further stretch student imagination for ideal features and tools in PLE&N environment.
4. If not, why? And what else you also like to receive/know/read?	To know what information and knowledge they would like to get from LMS	11. How your desired personal learning environment can take you to your key goals in a better way?	To make students think on their own feet why their ideal personal learning environment can take them to their key.
5. What other tools you commonly used to support your study?	This question asks the interviewee if they are currently using any tools to support their study.	12. In addition to achieving your key goals, what other benefits will your desired PLE&N?	To ask students about other benefits in addition to those that help them to achieve their key goals.
6. Apart from learning the subject, what else do you also need to know/learn?	To obtain information on students' learning needs beyond the curriculum	13. What are your goals of lifelong learning?	To understand how students aim to stay current and competitive.
7. Based on your experience, is the university-provided LMS helpful to your group work?	To know more about students' using university LMS to assist their group work. Follow-up questions are raised	14. If you are aiming for a lifelong learning tool, what sort of systems and/or features do you need?	Designed to let students think more long-term and imagine the systems and/or features that can be used long-term to cater for their learning needs

A total of 15 students were interviewed which include 4 undergraduate students, 5 part-time MSc students, 4 research students and 2 Doctor of Engineering students. The duration of each interview was around 40 minutes. One interview was conducted by phone.

On the basis of this preliminary interview, a series of popular tools was also recommended to students as shown in Table 2.

Table 2. Suggested Collaboration Tools in the Prototype PLE&N

Tool	Corresponding Need(s)	Tool	Corresponding Need(s)
Google+	✓ Cloud-based & Multimedia-oriented ✓ Free and Massive Connectivity	Youtube	✓ Cloud-based & Multimedia-oriented ✓ Sourcing and rating of learning content
Google Docs	✓ Storage Capacity ✓ Creation and use of collaboration tools	Dropbox	✓ Storage Capacity
Whatsapp and other Mobile communication tools	✓ Locate Expertise ✓ Orchestrate easily and flexibly	Linkedin	✓ Locate Expertise ✓ Free and Massive Professional Connectivity
Facebook	✓ Cloud-based & Multimedia-oriented ✓ Free and Massive Connectivity	Ning	✓ Cloud-based & Multimedia-oriented ✓ Creation of learning communities for on-going and ad-hoc discussion and resolution of issues and problems
Skype	✓ Creation of learning communities for on-going and ad-hoc discussion and resolution of issues and problems	Feedly	✓ Sourcing and rating of content relevant to learning and personal interest

The following criteria (together with design rationale) were considered when deciding whether to include a tool in each of the PLE&Ns for a student stereotype:

1. Does it support discussion? (This is the primary requirement for the PLE&N)
2. Does it have a RSS feeds function? (The PLE&N is indeed a semi-automatic bulletin board so it is crucial for it to receive RSS feeds for users to filter, read, tag, annotate and share)
3. Does it have various security settings? (Different learning communities are being created by allocating learners to respective group(s) in the PLE&N; learners are motivated to learn and share if they are surrounded by others with common goals and interest)
4. Does it enable collaboration? (Many functions are needed e.g. instant messaging, file sharing, video conferencing etc.)
5. Is it guided by profiles? (Profiles help to consolidate information about each learner and can act as a central point of information about a person)
6. What can this tool do that assists learning? (Review and project the total learning experience of a learner by using the combined set of tools)
7. What this tool cannot do? (Review any major shortfall of the platform)
8. What's the cost of this tool? (Obviously, a free tool would pose a much lower entrance barrier for a learner to install and adopt it)

With these criteria, after completion of each semester, a feedback questionnaires has been circulated among the participating students to assess the effectiveness of the prototyped PLE&N environment.

3. FINDINGS

3.1 Statistical Findings

Based on the feedback questionnaires collected from the students at the end of three semesters, a series of statistical analysis has been made for assessment of each criteria in each student category. Figure 2 shows the feedback from both undergraduate and postgraduate students.

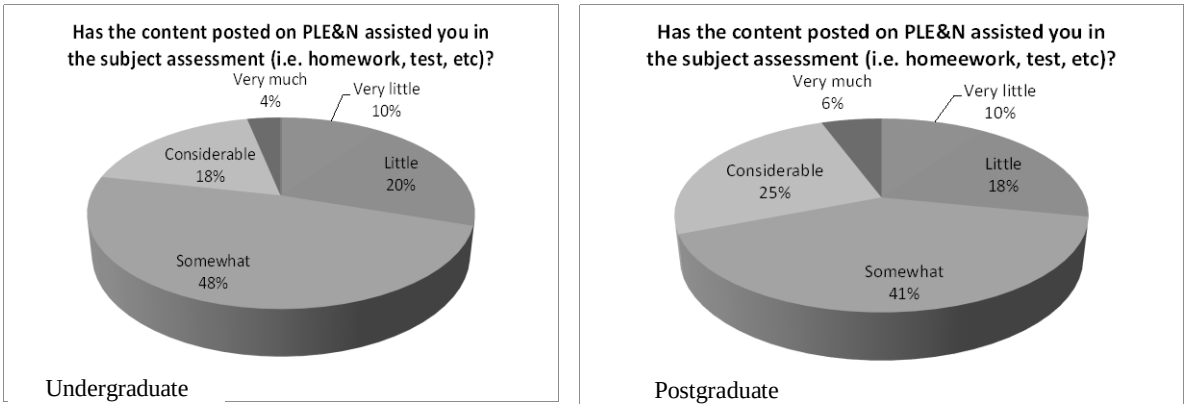

Figure 2. Feedback From Postgraduate And Undergraduate Students

As Figure 2 suggests, majority of the students find the PLE&N environment a supporting learning tool in their learning experience. During the trial period, all materials relevant to the enrolled subjects by the students are shared via the PLE&N. Obviously not all the shared material are directly related to those topics and issues that are being assessed (as what's being assessed is typically a fraction of what's covered in the lectures and the directed readings.) A better litmus test for students' appreciation of the PLE&N indeed is that more than 90% of the learners express they wish to remain in the PLE&N after a semester is over. Anecdotally, some 10-15% continue to post and comment in the PLE&N even after they have graduated from the university.

3.2 Interview Findings

3.2.1 Undergraduate Students

As for undergraduate stereotype, their key goals of learning are to earn good grades, spot their area of development and prepare their career. Their critical learning & career needs are to explore interests to find the desired pursuit of development areas, learn from senior people on the field and build up skillsets such as problem-solving skill. Though they share commonalities, individual differences do exist within the group. For example, local Hong Kong students are more proactive and mature in terms of planning their careers, while Chinese mainland students are more focused on university study to improve their knowledge and skills. In another comparison, male students are still in the stage of absorbing more knowledge and exploring more interest while female students have begun focusing on career planning.

3.2.2 Part-Time Postgraduate Students

For the part-time MSc stereotype, their key goals of learning are to learn knowledge from a broad range of areas and from others, to apply the knowledge learned at work, and to have career advancement.

Their critical learning & career needs are to organize knowledge better, have better communication and collaboration with others, and have more connections. Though they share commonalities, individual differences do exist within the group such as attitude towards life-long learning, what else is expected apart from learning the subject, etc. As an example, while one interviewee views life-long learning as part of natural life, another views it as steps for career advancement, and some others have not thought of it and just want to focus on the job-related learning now. These differences are observed to be due to characteristics such as age, position, area of working, etc.

3.2.3 Research Student

For research stereotype, their key goal of learning is to complete the degree and find a related job. Their critical learning & career needs are to have a communication and discussion platform with recommendations for their reference, have a platform for obtaining and organizing different sources of knowledge, and have a file-sharing system. Though they share commonalities, individual differences do exist. For example, male

researchers more openly express their pursuit of personal achievements. It has been also observed, that their focus and proactivity on their research area also varies significantly. These differences are due to their interests and other considerations such as funding.

3.2.4 Doctor of Engineering Student

For Doctor of Engineering stereotype, their key goal is to obtain a doctoral degree. Their critical learning & career needs are about obtaining relevant course materials anywhere anytime; for example, they expect to have access to a web-based system with online lectures. They also expect to get expert support, in addition to extending their network. Again, though they share commonalities, individual differences do exist. For example, some are focused on obtaining a doctoral degree while some others is interested in getting teaching and training opportunities through university education.

4. ADOPTION & SUSTAINABILITY OF THE PLE&N

In this section, we briefly discuss the motivation for learners to adopt the PLE&N and more importantly, factors that influence the continuing usage of the PLE&N. Based on feedback from learners (from surveys and interviews) and teachers' own reflection, the following factors play a key roles in influencing a learner to adopt and continue to use the PLE&N:

- Do-It-Yourself (DIY) – Installation, configuration and operation of the PLE&N need to be effortless. In our experience, students from both technical and business schools can install the PLE&N without any problem, often in less than half an hour. As the core components of the PLE&N are made up of Google tools in the public domain (i.e. they are in a Public Cloud), scalability and reliability of the PLE&N are guaranteed. We had had no interruption to accessing the PLE&N for years and there was also no need to contact the university's IT department as the Google cloud provides scalable and instantaneous support to all users. The tools are also free and together these circumstantial elements lead to rapid and massive adoption of the PLE&N by all users.
- Alignment with the learners' goals – As mentioned above, the needs and aspirations of the various types of users were prior ascertained, followed by the pre-configuration of an array of tools for each group of users to start using their "customized" PLE&N. These prior efforts and a pre-configured PLE&N have contributed to learner's adoption as the deployed PLE&N has already embedded a set of tools which are aligned to support the users' needs and objectives. Although each user can further customize his/her own PLE&N, providing a pre-configured PLE&N surely saves time and effort and users appreciate this arrangement more than just being provided with a "vanilla" (i.e. generic) PLE&N irrespective of their needs and background.
- Mobile Access – Nowadays most people access social systems via their tablets and smart phones. As a tool to support ubiquitous peer-based social learning, the PLE&N is no exception. In this regard, no extra work is needed as the Google and many of the deployed tools are already operating in a cloud environment hence usability issues have already been addressed. Mobile access to the PLE&N is therefore readily available and content are properly formatted for presentation.
- Value-Add – The PLE&N actually generally more benefits than merely acting as learning platform with a collection of tools for fostering communications and collaborations. In fact, over the years, all participants appreciate that there are value-add capabilities generated by the PLE&N. For example, teachers can, based on level of students' participation/contributions in various topics, ascertain the absorptive capacity of learners on specific topics thereby leading to alternative or additional learning paradigms to be explored, teachers can also treat the PLE&N as a "living repository" to harness learners' behavioral reactions to peer input, over time the "active contributors" of a PLE&N can be considered as core members of a learning community, and the content in the PLE&N, which often includes documents, links to web pages and webinars, can serve as prior reading or revision materials for Flipped Classrooms to be conducted.
- Rewards/Incentives – To all of the students, PLE&N is a revolutionary new concept. Never ever they have heard of nor encountered such a tool before. Hence, some incentives are needed to entice them to adopt and contribute to the PLE&N. This "incentive" comes in the form of, in most of the subjects that operate with the PLE&N, a 10% assessment of the subject for constructive and consistent contributions

throughout the semester. This level of assessment percentage was arbitrary set based on teachers' intuition and experience after taking into consideration that the PLE&N is new, students need time to adapt to this new learning environment and, especially for Asian, many students have the misconception that their postings may not meet the expectation or may even be ridiculed by the teacher. There is also a clear divide between the attitude of the undergraduate and postgraduate students in this regard. Overall speaking, from teachers' observation and feedback from the students, undergraduate students care a lot more about the marks allocated to the PLE&N whereas postgraduate students generally realize the power and benefits of the PLE&N and they care more about their learning than the marks being awarded by the teacher. Recently, there are encouraging signs as the latest round of feedback from the postgraduate students is that they want the marks for the PLE&N to be reduced or even abolished. Overall speaking, the 10% assessment mark for the PLE&N is felt to be appropriate to attract students to adopt and try out the PLE&N as a new and supplementary learning tool.

5. CONCLUSION

Result from the PLE&N project shows that the students' learning experience can improve by deploying some common (and mostly free) available tools. While Learning Management Platforms (LMS) provide students with an organized content and course materials plus the necessary collaborative tools, the PLE&N environment has indeed extend beyond the limited boundaries of the course syllabus, allowing students to read or disseminate knowledge on the Internet with their peers. The PLE&N also enables each and every learner to further customize the learning environment in terms of content, the layout and tools that they need or prefer and is not merely limited to the user interface customization in the LMS.

By identifying the learner stereotypes and needs, the PLE&N stereotypes experiment has been a good demonstration to show that, while it may not fully satisfy some students (e.g. those unfamiliar with the social networking tools), it can cover and satisfy many different student stereotypes to a great extent.

Currently, Some 10 subjects are operating with this prototype PLE&N by more than 4 teachers at Hong Kong polytechnic University with over 1000 participating students. As mentioned before in this paper, the collected feedback over three consecutive semesters shows that, over 90% of the participating students choose to continue operating their PLE&N platform after their graduation. This commitment by students is clearly aligned with the initial objective of this project which is to showcase how tools like the PLE&N can support life-long learning.

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REFERENCES

Cheong, R. K. F., & Tsui, E. (2010). The roles and values of personal knowledge management: an exploratory study. *VINE, 40*(2), 204–227. doi:10.1108/03055721011050686

Chou, S.-W., & Liu, C.-H. (2005). Learning effectiveness in a Web-based virtual learning environment: a learner control perspective. *Journal of Computer Assisted Learning*, *21*(1), 65–76. doi:10.1111/j.1365-2729.2005.00114.x

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, *15*(1), 3–8. doi:10.1016/j.iheduc.2011.06.002

Drachsler, H., Hummel, H. G. K., & Koper, R. (2008). Personal recommender systems for learners in lifelong learning networks: the requirements, techniques and model. *International Journal of Learning Technology* , *3*(4), 404–423. doi:10.1504/IJLT.2008.019376

Fiedler, S. H. D., & Väljataga, T. (2011). Personal Learning Environments. *International Journal of Virtual and Personal Learning Environments*, *2*(4), 1–11. doi:10.4018/jvple.2011100101

Hwang, G.-J., & Chang, H.-F. (2011). A formative assessment-based mobile learning approach to improving the learning attitudes and achievements of students. *Computers & Education*, *56*(4), 1023–1031. doi:10.1016/j.compedu.2010.12.002

Lee, W. B., Cheung, C. F., Tsui, E., & Kwok, S. K. (2007). Collaborative environment and technologies for building knowledge work teams in network enterprises. *International Journal of Information Technology and Management* , *6*(1), 5–22. Retrieved from http://inderscience.metapress.com/content/0PD4RF9GDGRJK7GB

Mupinga, D. M., Nora, R. T., & Yaw, D. C. (2006). The Learning Styles, Expectations, and Needs of Online Students. *College Teaching*, *54*(1), 185–189. doi:10.3200/CTCH.54.1.185-189

Robertson, M., Line, M., Jones, S., & Thomas, S. (2000). International Students, Learning Environments and Perceptions: A case study using the Delphi technique. *Higher Education Research & Development*, *19*(1), 89–102. doi:10.1080/07294360050020499

Tsui, E., Cheong, R. K. F., & Sabetzadeh, F. Cloud-Based Personal Knowledge Management as a service (PKMaaS), 2011 International Conference on Computer Science and Service System CSSS 2152–2155 (2011). IEEE. doi:10.1109/CSSS.2011.5975019

Wang, S.-L., & Wu, P.-Y. (2008). The role of feedback and self-efficacy on web-based learning: The social cognitive perspective. *Computers & Education*, *51*(4), 1589–1598. doi:10.1016/j.compedu.2008.03.004

Zimmerman, B. J. (2008). Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *American Educational Research Journal*, *45*(1), 166–183. doi:10.3102/0002831207312909