Are mash-ups the future for online learning platforms? Psychology A-level students' judgements about VLE and MUPPLE interfaces

Matt Jarvis, Lizzie Gauntlett & Hayley Collins

Virtual Learning Environments (VLEs) have become ubiquitous in colleges and universities but have failed to consistently improve learning (Machin, 2007). An alternative interface can be provided in the form of a mashed-up personal learning environment (MUPPLE). The aim of this study was to investigate student perceptions of its desirability and utility in comparison to their existing VLE. A psychology-oriented MUPPLE was constructed using a free online mash-up platform. A focus group of psychology A-level students was asked to identify likely advantages and disadvantages of the MUPPLE as compared to their existing VLE interface. They identified five potential advantages of the MUPPLE interface; aesthetics, congruence with online apps used outside formal education, user control, utility as an aid to A-level study, and likely utility as an aid to undergraduate study. With regard to utility as an aid to A-level study, the focus group expressed concern that, whilst the MUPPLE interface would be likely to enhance independent study, that this might not in turn advantage A-level students. However, no advantages were attributed to the VLE interface. Sixty-five psychology A-level students assessed a MUPPLE and a VLE interface against the five criteria identified by the focus group. A within-subjects MANOVA revealed significant preferences for the MUPPLE interface on all five criteria. Implications for psychology education are discussed, and further research is called for.
Keywords: *virtual learning environment; learning management system; MUPPLE; e-learning; web 2.0.*

'THE FUTURE [of education] is digital' (Warschauer, 2007, p.41)). This much seems fairly certain, however, whilst technological, cultural and economic change all point towards a growing dependence on e-learning, this cannot currently be said of pedagogical factors. A decade into the 21st century we are at 'an interesting point' (JISC, 2008, p.3), where the use of learning technologies is deeply embedded in educational practice and yet the relationship between learning and technology remains an uncomfortable one in the face of a dearth of evidence linking technology to consistent improvements in education. In a recent review Machin et al. (2007) concluded that there is evidence for improvement effects in some subjects but not in others, with psychology not having been formally evaluated. In this context it is important that teachers and lecturers better understand how students respond to learning technology.

Technology is increasingly multifaceted, with the consequence that we can no longer speak of even learning technology as a unified field moving in a particular direction. This article is concerned with online learning platforms, one (important) aspect of learning technology. Learning platforms can be defined as the online interfaces through which people, content artefacts and activities are brought together (Wild, Modritscher & Sigurdarson, 2008) Learning platforms frequently but not exclusively employ purpose-built Virtual Learning Environment (VLE) packages such as *Moodle*, *BlackBoard* or *WebCT*. Although an extensive search revealed no official statistics, the existence and extensive use of some form of online learning platform can probably be taken as ubiquitous in UK Further and Higher Education (Stiles, 2007) In schools the picture is more mixed, with most secondary schools describing VLE technology as

new and unfamiliar, and with no school examined consistently using a VLE across the curriculum (Ofsted, 2009).

The rise and stutter of the VLE

Learning platforms are currently dominated by the virtual learning environment (VLE) model, in which tasks, resources and some record of academic progress are made available online to students by tutors. The widespread introduction of virtual learning environments has undoubtedly had benefits for staff organisation (Heaton-Shreshtha et al., 2005), and *may* help widen participation (though see Sims, Vigden & Powell, 2008, for a vigorous challenge to this claim). A limited number of studies have indicated clear benefits of VLEs for student learning (see, for example, the work of Chou & Liu, 2005, conducted in Taiwan), however, most such studies have been conducted in particular cultural contexts and may not generalise well to the UK education system. There are also studies showing that multimedia resources made available to students via a VLE facilitate superior learning to traditional paper resources (see, for example, Evans, 2008). However, there is little direct evidence to suggest that virtual learning environments do anything to enhance the quality of learning for the typical UK student. In fact, some published outcome studies, for example, Mottarella et al. (2005) that compare learning of psychology mediated by a VLE with traditional undergraduate teaching have shown negative outcomes.

Explanations for the pedagogical failure of current VLE technology focus on the mismatch between the delivery model and current understandings of learning and cultural norms for how technology is used outside formal education. Stiles (2007) suggests that VLEs are 'fixed in an orthodoxy based on traditional educational approaches' (2007, p.31). Put another way, learning platforms are defective by design (Wild, Modritscher & Sigurdson, 2008) because they depend on an instructional model of learning in which students have to adapt to the technology by passively receiving information. On a cognitive level this is almost certainly not how we learn most effectively. On a cultural level, the positioning of the learner as a passive consumer and the level of control exerted over the user experience by institutions employing the VLE model are wildly incongruent with the typical use of internet technology in contexts outside formal education (Selwyn, 2007; Stiles, 2007). VLE technology tends to limit self-regulation and personal agency (Turker & Zingel, 2008), both critical in the learning process. Technology designed to enhance these factors is the province of Web 2.0.

The implications of Web 2.0

The term 'Web 2.0' was first used to describe a set of web applications characterised by greater activity and user control than had been hitherto possible (O'Reilly, 2005). These applications include those dedicated to blogs, wikis, RSS feeds, social networking, social tagging and chat-rooms. The move to Web 2.0 is more than a cosmetic change in our use of computers; it is a significant cultural shift compared by some commentators to the invention of the printing press (Warschauer, 2007).

Current virtual learning environment technology can incorporate Web 2.0 functionality and indeed the most successful VLEs, at least as rated by frequency of student use, such as that developed by the Open University, rely heavily on the use of Web 2.0 functions (HEFCE, 2011). However, most teachers and lecturers using VLEs do not make extensive use of Web 2.0 functions, and the current generation of VLEs do not provide the best platforms for such functionality. The blog, forum and wiki functions within current virtual learning environments tend to be both visually unappealing and limited in functionality. They may be Web 2.0 but they are 'rubbish Web 2.0.'

Enter the MUPPLE

If virtual learning environments can incorporate Web 2.0 functions but badly (Stiles,

2007), what is the alternative? A model rapidly gaining ground amongst e-learning researchers if not yet widely seen 'on the ground' is the MUPPLE or mashed-up personal learning environment. MUPPLES have been born of the growing awareness of the limitations of the 'build it and they will come' mind-set (Lane & Lyle, 2010) and a new emphasis among developers on adapting systems to service human learning and cultural norms of technology use. Taraghi, Ebner and Schaffert (2009) define a MUPPLE as 'learning applications where the learner can integrate and organise distributed online information, resources and contacts, as well as also to provide content' (2009, p.16). Put simply, a MUPPLE is a webpage constructed and owned by the student that displays within it other websites specialising in particular tasks. There is no reason why a MUPPLE need be built on a dedicated educational platform – it is the elements the user builds into the MUPPLE that make it a *learning* environment. Suitable platforms on which MUPPLEs can be constructed include *i-Google* and *NetVibes* (Drachsler et al., 2009).

Where VLEs are closed and rigid with tight institutional control, MUPPLEs have the opposite philosophy (Auinger et al, 2009). They are usually hosted independently of the education establishment and are under the control of the student, who accordingly takes on the role of active *prosumer* of information as opposed to passive consumer. With tutor guidance – but not control – the user 'mashes' or puts together the Web 2.0 technologies in the form of blocks on their web page. In some ways MUPPLEs are so philosophically different from the VLE model of learning platforms that some commentators see them as more appropriate for informal than formal learning (Drachsler et al., 2009).

Much of the existing literature focuses on the shortcomings of VLEs as they are widely used and the advantages of a MUPPLE interface. However, there is no reason why a VLE cannot be incorporated into a MUPPLE (Alario-Hoyos & Wilson, 2010), allowing a user the ability to prosume information from their institution in the context of their own choice of learning tools. This is the philosophy underlying the MUPPLE trialled in the present study, and aims to address the criticism that MUPPLEs are not appropriate for formal learning.

Aims

The overall aim of the project was to investigate the viability of the MUPPLE model in a psychology context. Two specific aims were investigated:

1. To investigate the practicality of creating a fully functional MUPPLE using free, currently existing tools and without specialist coding skills.
2. To investigate the perceptions of psychology students of the resulting MUPPLE in terms of both its user-friendly interface and utility as a learning tool.

Method

Constructing the MUPPLE

Initially an existing VLE environment *(Moodle 2)* was trialled as the host platform. However it quickly became apparent that without extensive coding *Moodle* could only provide a 'clunky' and unattractive interface for a mash-up. Following a literature search the *NetVibes* platform (www.netvibes.com) was identified as a suitable host platform (Drachsler et al., 2009). *NetVibes* is not a learning platform as such but a personal environment (PE). It provides an interface through which users can easily access a wide range of online services of their choice. *NetVibes* was judged to provide an attractive, customisable and user-friendly platform into which educational functions could be integrated. *NetVibes* provides a page on to which services can be dropped by means of dedicated widgets and RSS feeds. Crucially it can also open other websites and web-mail in blocks of controllable size and position on the main page.

Selecting the page elements of the MUPPLE represented a balance of simplicity against range of functionality and of educa-

tional specificity against general usefulness. Given that user-ownership is a key element of a MUPPLE and that users can easily customise their MUPPLE it was not deemed essential to design the 'definitive MUPPLE', just to develop a working example sufficiently attractive and useful to establish user impressions. A demonstration model (shown in Figure 1) was constructed by a psychoology tutor. It comprised the following elements:

- To-do list (via *NetVibes* widget).
- Personal and course web-mail (via *NetVibes* widgets).
- *Facebook* feed.
- Virtual Learning Environment (via *Moodle*).
- e-Portfolio (via *Box.net*).
- Citation manager (via *Mendeley*).
- Statistical analysis (via *BrightStat.com*).

Participants

Eight psychology A-level students (seven female, one male, all aged 18 years) took part in the focus group. Sixty-five different psychology A-level students (40 female, 25 male, all aged 17 years) took part in the main study.

Design and procedure

A focus group was conducted in order to tease out student perceptions of the possible strengths and weaknesses of MUPPLE and VLE interfaces. Participants were shown a demonstration MUPPLE on a projector screen then shown their existing VLE psychology front-page for comparison. They were asked to identify potential advantages and disadvantages of the MUPPLE interface as compared to their existing VLE interface. Once the task had been set the discussion was unstructured, the role of the researcher being limited to minimal prompts to participants to continue or expand on points. The resulting discussion was subject to thematic analysis. Five themes emerged from the focus group discussion.

- Aesthetics.
- Congruence with online apps used in other contexts.
- User-control.
- Utility as an aid to A-level study.
- Likely utility as an aid to undergraduate study.

Figure 1: The demonstration MUPPLE.

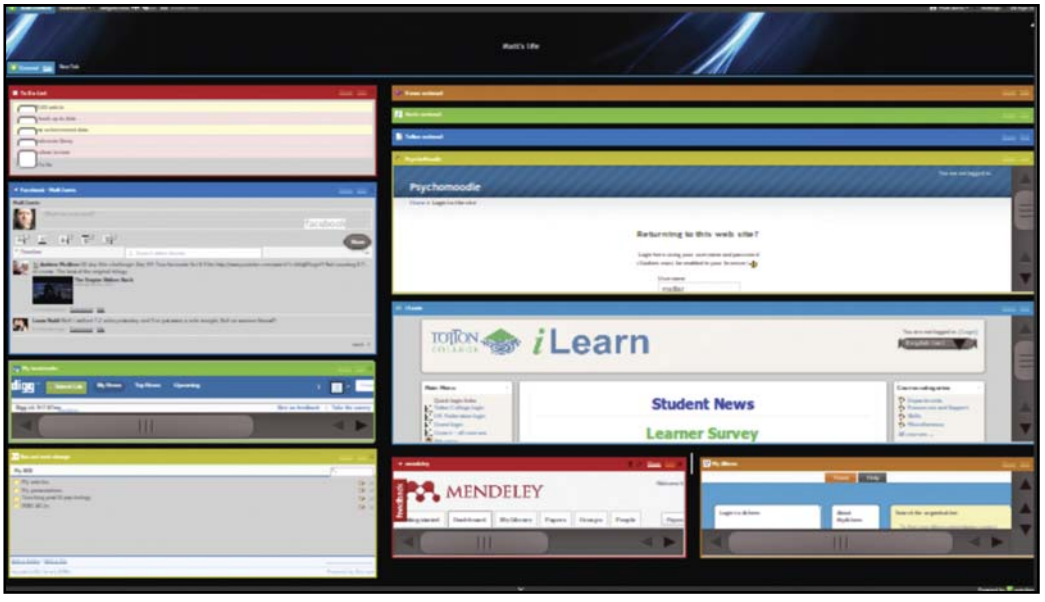
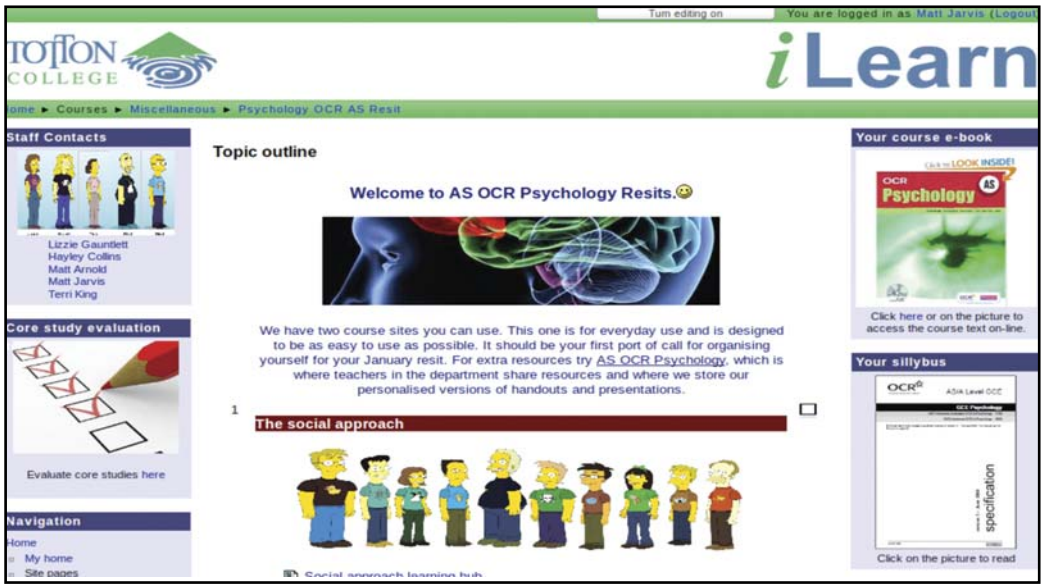


Figure 2: The comparison VLE.



These five themes informed the construction of the questionnaire administered in the main study. The initial display of the MUPPLE to participants was done in the same way as for the focus group. In their usual teaching groups consenting participants were shown a demonstration MUPPLE and their existing VLE on a projector screen. To control for possible order effects the order in which the two interfaces were displayed was counterbalanced. Participants were then immediately administered a questionnaire designed to collect quantitative data about their perceptions of the VLE and MUPPLE interfaces.

The questionnaire consisted of 10 items in the form of five-point Likert scales. Five items referred to the MUPPLE and five matched items referred to the VLE. The independent variable was thus MUPPLE or VLE. Rating scales measured five dependent variables; student perceptions of the two interfaces in terms of their aesthetics, congruence with other internet use, level of personal control and utility for study, both for A-level and undergraduate level. As a control measure the wording of each item was matched as closely as possible between the VLE and MUPPLE items.

Results

On all five dependent variables the MUPPLE interface was rated more highly than the VLE interface. Mean ratings are shown in Table 1. The largest differences was in user-control, the smallest in utility as an aid to A-level study.

A one-way within-groups multivariate analysis of variance was performed on the results, data meeting the preliminary assumptions for MANOVA. Five dependent variables were used: aesthetics, congruence with online apps used outside formal education, user control, A-level study utility and university study utility. There was a highly significant difference between overall ratings of the MUPPLE and VLE (F=42.23, Wilkes Lambda=0.22, p<0.001, partial eta^2=0.78). When results for each dependent variable were considered separately all reached significance. For aesthetics, congruence, user control and utility as an aid to university study significance was at the p<0.001 level. The difference in MUPPLE and VLE ratings was substantially smaller for utility as an aid to A-level study (p=0.014).

Table 1: Descriptive statistics.

Interface		*Aesthetics*	*Congruence*	*User control*	*A-level utility*	*University utility*
MUPPLE	*Mean*	3.58	3.35	4.03	3.50	3.54
	SD	0.70	0.94	0.81	0.84	0.90
VLE	*Mean*	2.60	2.03	2.03	3.16	2.85
	SD	0.77	0.97	0.77	0.82	0.83

Discussion

The first aim of the project was to establish whether current freely available technology facilitates the construction of a workable MUPPLE without specialist coding skills. It is concluded that this is not only possible but surprisingly straightforward. The *NetVibes* platform proved to be user-friendly, and a protocol has now been constructed allowing students to design and construct their own MUPPLE in less than an hour. The aim of the formal study was to investigate psychology A-level students' judgements about the MUPPLE interface. Students expressed a clear overall preference for the MUPPLE interface over that of a traditional VLE. The clearest preferences for MUPPLEs were with regard to user-control and congruence with online apps used outside formal education. Caution is required when interpreting such findings but they are at least consistent with suggestions by Selwyn (2007) and Stiles (2007) that VLE technology is incongruent with other contemporary online applications and Turker and Zingel's (2008) concerns over personal agency in the use of VLE technology. In the survey the smallest advantage accorded to MUPPLEs was in respect of utility as an aid to A-level study, this only achieving a significance of 0.014. This is consistent with the focus group discussion in which some participants expressed a concern that the sort of independent learning facilitated by MUPPLEs conveys little or no advantage in A-level study, echoing Drachsler's (2009) concern that MUPPLEs may be better suited to informal than formal learning situations.

There are important limitations to the current study, and it is perhaps best seen as a first step in an ongoing project to investigate MUPPLEs. Studies like this that focus on students' first impressions of technology are salient in that first impressions can be important in establishing engagement with the technology. However, the current data says little about how user-friendly and useful students will find MUPPLEs for regular use, so follow-up studies are required. Although the researchers who presented the VLE and MUPPLE to participants were unfamiliar with the MUPPLE it was not possible to conduct a blind design, so both demand characteristics and the novelty of the MUPPLE may have biased student responses in its favour. In addition the sample was limited in size and gathered from a single institution, and it may be that results were confounded by local factors such as students' prior experiences of VLE technology. Replication in a range of contexts is thus called for.

Clearly the present study requires rigorous replication and follow-up before radical policy shifts are called for. Nonetheless the study does suggest implications for the psychology classroom. Previous studies (e.g. Machado & Tao, 2007) have found that students prefer the *Moodle* VLE used as the control condition in this study to alternatives such as *Blackboard*, and that compared to other VLEs the *Moodle* interface is relatively facilitating of personal agency. Moreover, the VLE used in the present study had been independently rated as 'gold' standard. The strong preference shown by participants for the MUPPLE interface over that of this high

quality VLE interface is, therefore, strongly suggestive of advantages to adopting the MUPPLE model. In particular, the focus group identified the link between the MUPPLE interface and independent learning, and it may be that MUPPLEs become a tool for encouraging personal agency and independence of learning mitigated against by some aspects of the current education system. Little is likely to be lost from the student experience when their institutional VLE is incorporated into their MUPPLE.

The present study suggests that the MUPPLE is a promising model for future online learning platforms. However, this raises further research questions, both with regard to ongoing student responses and institutional responses. The most basic question concerns how useful students find MUPPLEs in day-to-day use? This requires a longitudinal study. However, general trends emerging from such a study may obscure individual differences in student MUPPLE-related behaviour, and additional research is needed to establish what student-variables are associated with positive perceptions and effective use of MUPPLEs. In practical terms, student responses are not the only factors affecting the viability of MUPPLEs. It also remains to be seen how schools, colleges and universities will respond to MUPPLEs in the light of their loss of control over the learning process.

Conclusions

Constructing a mashed-up personal learning environment is a straightforward process, and can be done using free tools and without coding skills. The present study suggests that psychology A-level students prefer such mash-ups to their standard VLE interface, principally because of its superior aesthetics, user-control and greater congruence with online apps used outside formal education.

Correspondence

Matt Jarvis
Email: matt.jarvis2@btinternet.com

References

Alario-Hoyos, C. & Wilson, S. (2010). Comparison of the main alternatives to integration of external tools in different platforms. *Proceedings of the International Conference of Education, Research and Innovation*, ICERI 2010, 3466–3476, Madrid, Spain, November.

Auinger, A., Ebner, M., Nedbal, D. & Holzinger, A. (2009). *Mixing content and endless collaboration – mash-ups: Towards future learning environments*. HC11 Conference, San Diego.

Chou, S. & Liu, C. (2005). Learning effectiveness of a web-based virtual learning environment: A learner control perspective. *Journal of Computer-assisted Learning, 21*, 65–76.

Drachsler, H., Pecceu, D., Arts, T., Hutten, E., Rutledge, L., van Rosmalen, P., Hummel, H. & Koper, R. (2009). ReMashed: Recommendations for mash-up personal learning environments. In U. Cress, V. Dimitrova. & M. Specht (Eds.), *EC-TEL 2009, LNCS 5794* (pp.788–793). Heidelberg: Springer-Verlag.

Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers in Education, 50*, 491–498.

JISC (2008). *Exploring tangible benefits of e-learning: Does investment yield interest?* JISC, Northumbria University.

Heaton-Shreshtha, C., Edirisingha, P., Burke, P. & Linsey, T. (2005). Introducing a VLE into campus-based undergraduate teaching: Staff perspectives on its impact on teaching. *International Journal of Education Research, 43*, 370–386.

HEFCE (2011). *Collaborate to compete: Seizing the opportunity of online learning for UK higher education*. Bristol: HEFCE.

Lane, C.A. & Lyle, H.F. (2010). Obstacles and supports related to the use of educational technologies: The role of technological expertise, gender, and age. *Journal of Computing in Higher Education, 23*, 38–59.

Machado, M. & Tao, E. (2007). *Blackboard vs. Moodle: Comparing user experience of learning management systems*. 37th ASEE/IEEE Frontiers in Education Conference. October, Milwaukee.

Machin, S., McNally, S. & Silva, O. (2007). New technology in schools: Is there a pay-off? *Economic Journal, 117*, 1145–1167.

Mottarella, K., Fritzche, B. & Parrish, T. (2005). Who learns more? Achievement scores following web-based versus classroom instruction in psychology courses. *Psychology Learning & Teaching, 4*, 51–54.

Ofsted (2009). *Virtual learning environments: An evaluation of their development in a sample of educational settings*. London: Ofsted.

O'Reilly, T. (2005). *What is Web 2.0?* Available at: www.oreilly.de/artikel/web20.html

Selwyn, N. (2007). The use of computer technology in university teaching and learning: A critical perspective. *Journal of Computer Assisted Learning, 23*, 83–94.

Sims, J., Vigden, R. & Powell, P. (2008). E-learning and the digital divide: Perpetuating cultural and socio-economic elitism in Higher Education. *Communications of the Association for Information Systems, 22*, 429–442.

Stiles, M. (2007). Death of the VLE? A challenge to a new orthodoxy. *Serials, 20*, 31–36.

Taraghi, B., Ebner, M. & Schaffert, S. (2009). Personal learning environments for Higher Education: A mash-up-based widget concept. *Proceedings of the 2nd Workshop on Mash-Up Personal learning Environments (MUPPLE '09)*. Nice, France.

Türker, M.A. & Zingel, S. (2008). Formative interfaces for scaffolding self-regulated learning in PLEs. *E-Learning Papers, 9*, np.

Warschauer, M. (2007). The paradoxical future of digital learning. *Learning Inquiry, 1*, 41–49.

Wild, F., Modritscher, F. & Sigurdarson, S. (2008). Designing for change: Mash-up personal learning environments. *E-Learning Papers, 9*, np.