

Diversity and Conformity in the Use of Technology by 'Net Generation' Learners; Exploring Research Outcomes to Inform Future Academic Practice

Amanda Jefferies

School of Computer Science, Learning Teaching Institute, University of Hertfordshire, United Kingdom
a.l.jefferies@herts.ac.uk

Abstract:

A number of names have been given to the generations born in the last 50 or so years, which have sought to identify characteristics of those born in those eras. Most recently we have seen the 'Net Generation' coined by the Oblingers at Educause for those reaching maturity after the year 2000, to define the current university generation and their dependence on the internet. Elsewhere the assertion for an identifiable 'digital native' type was proposed by Prensky, (2001). This latter view has been firmly challenged recently and a number of researchers now assert that the reality of the learners' experiences of using technology is diverse and complex rather than simplistic.

The author considers how learner diversity can and does extend beyond age, gender, access to technology and cultural background and leads to a rich diversity of the learner and their engagement with learning technology. At the same time there are clear arguments for asserting some conformity in the outlook and practice of university students regarding the importance of technology in their lives. Many students accept apparently unquestioningly the ubiquity of technology in their lives and as discussed below mix being online for leisure and learning all through their day.

In this paper outcomes from a research project carried out in a technology-rich university, where student users first kept video and audio diaries to reflect on their use of technology for learning are shared. Most recently a selection of these students have been interviewed and invited to reflect on the role that technology occupies in their lives as they complete undergraduate studies. They were invited to reflect on their experience of different pedagogic styles and the amounts of technology used by academics and by themselves for their private study. This was in addition to their experiences of both blended learning within a face-to-face taught environment. The results shared in the paper have shown a certain conformity regarding the importance of access to technology in their personal and study lives, however these students' preferences for pedagogic style have varied surprisingly. The diversity is indeed more complex than previously expressed.

Keywords: Blended learning, pedagogic style, student experience, technology use

1. Introduction

Since January 2007 there has been extensive research carried out through a number of national and international organisations into student experiences of learning with technology, for example studies funded by JISC, Educause (Oblinger and Oblinger, 2007) and ECAR (Caruso and Salway, 2007). These have uniformly highlighted the fact that the generation of 18 year olds which is now entering Higher Education (HE) in the UK and U.S. as undergraduates during the first decade of the 21st century is both more technically knowledgeable and confident than any previous group of new students (Littlejohn, 2010, Hardy, 2009). They also exhibit very high expectations of the technologies they currently use for personal and social use (Melville, 2008) and have indicated that they now have high expectations of using technology to access and support their future learning. For these students the presence of a reliable course management system at their place of study with on and off campus access available every day of the week is now seen as part of their normal expectation rather than an optional extra to support their undergraduate learning. In the UK at least this growth in the use of technology for educational purposes has been supported by generous levels of national funding in schools and universities through the 21st century and since the need for investment was first highlighted by the outcomes of the Dearing report in 1997, (Dearing, 1997). As was evidenced in the students' stories (Jefferies, 2010) this funding has not been matched across the sector in other countries, with one student reporting on his experience of studying abroad in the library of a German

university where there were minimal electronic resources available for searching non-paper based archives and students on an exchange visit to the U.S. having less access to computing and online learning facilities.

Much has been written recently about the ubiquity of technology for the younger, as well as the older generation, and its pervasiveness throughout every aspect of their lives. Students entering HE have been subject to a variety of 'nicknames' in recent years which seek to link their generation with the technology which has been seen to characterise them. Thus we notice the use of the titles of the 'i-Pod generation' and the 'Net generation' (Oblingers, *ibid*) for students, alongside Prensky's early assertion that there is a physical change happening in young people's brains to the extent that he suggested they were 'digital natives', (Prensky,2001). While the popular press has continued to delight in using the 'digital native' moniker, there has been diminishing support for an unproven proposal of a physical change in students' abilities to learn differently from previous generations (see for example the work of Jones, 2010 *inter alia*). As the work from Beetham into digital literacies has proposed (Beetham,2009), the situation is both far more diverse and more complex than might have been thought at the beginning of the decade

1.1 Technology enhanced learning at the University of Hertfordshire

At the University of Hertfordshire there has been early and consistent investment in a managed learning environment, known as StudyNet which has proved very popular with students for supporting their learning both undergraduate and postgraduate, those studying at one of the three main campuses as well as those based across the world and now studying through one of the fully online programmes. The setting up in 2005 of the University's Blended Learning Unit (BLU) as a Centre for Excellence in Teaching and Learning through national funding from the Higher Education Funding Council for England (HEFCE), has supported research and development into the use by students and academics of different technologies including the so-called collaborative Web2.0 technologies such as wikis and blogs (Hilliard and Lorimer, 2009 and Cubric, 2010) to enhance learning and teaching activity. The university has sought to transform teaching and learning activities by the use of technology from the premise that there are great possibilities for using technology to enhance the learning process and when combined with a transformational culture which impacts academics across the institution, these in turn can create a well regarded blended learning environment.

In this paper the author reviews some of the research into the changing learner experience that has been carried out in the past five years and also considers whether student expectations regarding use of technology have been met and what students state that their own preferences for teaching styles in the classroom are.

In 2005 the first survey of students entering HE was carried out by a small team in the BLU at Hertfordshire. It sought to establish what students' prior experiences of technology use for learning and leisure were and student preferences for their learning environment, (Jefferies, Quadri, and Kornbrot, 2007). The outcomes have been disseminated widely and show a clear comparison with other studies carried out into learner attitudes to HE (e.g. Littlejohn, *ibid*; Haywood et al, 2004). Students are entering HE with increasing expectations of technology use, they are growing in their confidence at using technologies personally and ownership of personal technology devices is very high, (i.e. mp3 players, mobile phones, laptop computers etc). In 2005 however personal ownership of computers was lower at Hertfordshire than has been shown in comparable studies of student ownership of technology elsewhere. By the time of the next study of new entrants into HE at Hertfordshire in September 2007 personal ownership of computers had risen steadily and confidence which was self-assessed by the students had risen to the point where 87% of the students were saying in 2007 (Jefferies and Goossens, 2008) that they were 'very' or 'extremely' confident at using technology to support their learning when compared with the figure of 74% from the 2005 study. An exit poll was carried out in the same academic year and aimed generally at graduating students rather than to those who had specifically responded to the entry questionnaires. The survey invited those who had entered HE as first year undergraduates in 2005 or earlier to comment on firstly their use of technology and secondly their personal confidence level in using technology for learning. Both of these figures showed a significant increase on those from the earlier survey indicating both a growth in overall use of technology for learning and in personal confidence at using technology throughout students' study time at the university, (Jefferies and Goossens, *ibid*).

Alongside this research being carried out in the Blended Learning Unit into confidence and extent of technology use, the author was researching a separate group of students who were part of a longitudinal study intended to clarify aspects of the students' 'learning journeys'. Working with over 50 undergraduate students from a wide variety of backgrounds and programmes the research investigated students' uses of technology for learning and leisure and sought to identify whether their use of technology was as ubiquitous as implied elsewhere in academia and in the popular press. Students reflected on their learning through the use of personal video and audio diaries and via focus groups and interviews. This research has been disseminated in part at previous ECEL conferences (e.g. Jefferies and Hyde, 2008,2009) and widely elsewhere (STROLL,2009). Most recently the research has involved interviews with a subset of the original students as they prepared for graduation to investigate how they viewed their use of technology to enhance their learning and the changes which they had experienced as students as they matured in their learning. How far could these students be said to be part of the 'Net generation'? Did they favour a blended approach to their learning or would they have preferred a purely face-to-face approach? Conversely did the students think that there was enough technology to support their learning or would they have preferred more online materials?

2. Developing a framework to consider campus-based students' uses of technology in their learning

Interviews were carried out with eight of the original student participants in the video diary reflections. Four male and four female students were interviewed and they were chosen from a variety of programmes of study from across the University as indicated in Table 1 below. The pool of available students had diminished rapidly because a number of the original diarists had graduated and moved away from Hatfield and so they were therefore no longer available for interview. The students in this smaller group represent a cross-section from the programmes the University runs and contains representatives from each of the four Faculties. The original age range of the participating undergraduates (n=54) extended from 18 to 51 and thus included a number who would be classified as mature entrants. However, in excess of 80% of undergraduate entrants to the university are aged between 18 and 24 when they first enrol and this interview group reflected the members of this majority age group. These students were all aged in their 20s by the time they were interviewed. The overall ethnicity of the group reflects the university's own ethnic make up which has a significant intake of non-white entrants.

Table 1 Student Participation in the Interviews

Student	Gender	Programme of Study	Ethnicity
1	Male	AI and Psychology	White British
2	Male	International Business with German	White British
3	Male	3D Graphics and Digital technology	Black Afro-Caribbean
4	Male	Business Studies	White British
5	Female	Computing and Business	Black Afro-Caribbean
6	Female	English	White British
7	Female	Philosophy	White British
8	Female	Midwifery	White British

The aim of the interviews was wider than the outcomes reported here and produced 3 artefacts: the student interview transcripts, student constructed models of their learning with technology and their own hand completed frameworks which are reported below. Student narratives have been constructed from the transcripts of their interviews and these with the student constructed models of their learning have been reported elsewhere (Jefferies, 2010)

The first stage in the interview was to discuss the use and amount of blended learning at the university and to invite students to consider their learning within the continuum shown in Figure 1 below. The context of blended learning at Hertfordshire is described as '*Educational provision where high quality e-learning opportunities and excellent campus based learning are combined or blended...*' (Bullen, 2004) and at Hertfordshire blended learning has developed to the point where the MLE StudyNet is seen as fully embedded within the culture for academics and students. In Figure 1

the technology content of student learning is identified as taking place within the continuum from a purely face-to-face context or in a blended learning context or purely online. The amount of online technology involved in the student's learning moves from zero to 100% from left to right and the personal teacher involvement in the daily study process changes from being physically present at the point of delivery to being either non-existent and/or to supporting the student asynchronously online, although opportunities exist for online synchronous discussion.

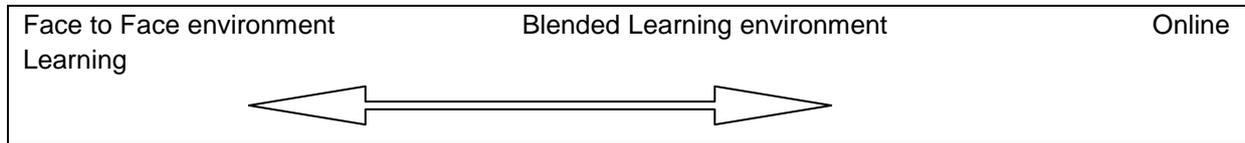


Figure 1 A continuum for including technology into student learning

From the students' perceptions of their learning environment most of them placed the majority of their learning as taking place firmly within the blended learning environment with a greater or lesser amount of online technology being used. The blend they experienced varied according to the content of their programme as outlined by Bullen above. Just a very few supplementary courses were taken by this campus-based group which could be classified as purely online with no personal synchronous face-to-face input from the tutor.

Perhaps surprisingly there was a significant amount of material which was being delivered within the campus-based environment, where little additional online media were being used and which the interviewed students (who generally used many personal technologies) classified as being embedded in a face-to-face environment rather than a blended approach.

The next step in the interviews was to invite the students to reflect on the pedagogic styles they experienced. Sharpe commented that *'reviews of the pedagogic literature in the UK and Australia confirm that constructivism is the dominant model of learning influencing school and post-compulsory education,'* (Sharpe, 2008). While it has been a rising model of learning it is not however the sole model and Mayes and de Freitas identified four possible theoretical models for pedagogy in learning and e-learning in their summary of pedagogic theory (Mayes and de Freitas, 2008). The four theories: Associative, Constructivist, (further subdivided into individual and social) and Situative have their adherents and their strengths and weaknesses and different implications for the design of future learning with technology. As Mayes and de Freitas note these are not necessarily to be seen as in competition (ibid, p15) but a *'set of quite compatible explanations for a large range of different phenomena'*. Accordingly the author shows how a continuum can be plotted between these four theories which moves from the 'more formally structured tasks' of an associative model, according to Mayes and de Freitas to what they call 'more authentic contexts for learning' (ibid, p221), with the situative model which is based on developing communities of practice (Wenger,1998) .

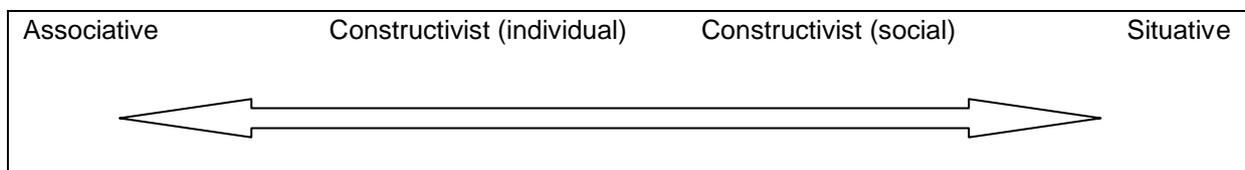


Figure 2 A continuum for models of pedagogy (after Mayes and de Freitas)

In the interviews the students were presented with a simplified description of the pedagogic models in a vertical diagram so that the technical language did not confuse them and invited to plot their experiences of pedagogic style. What transpired and is indicated in the student models reproduced below is that the students experienced a variety of different models of pedagogy which was in contrast to Sharpe's proposal for the current predominance of a constructivist model for learning. Students and in particular those from a Humanities programme described their pedagogic experiences as often including Associative styles of learning with which they were perfectly happy.

The final stage in the interview on pedagogic styles and the use of technology for learning was to combine the two previous models described (Figures 1 and 2) into a framework which combined pedagogic models and the use of technology for learning and to invite the students to review their learning in terms of both the technology component and the pedagogic model. This is presented below in Figure 3 and was used as part of the conversation to identify with the students where their learning was taking place. The students identified both the style of learning and the use of technology which they had experienced.

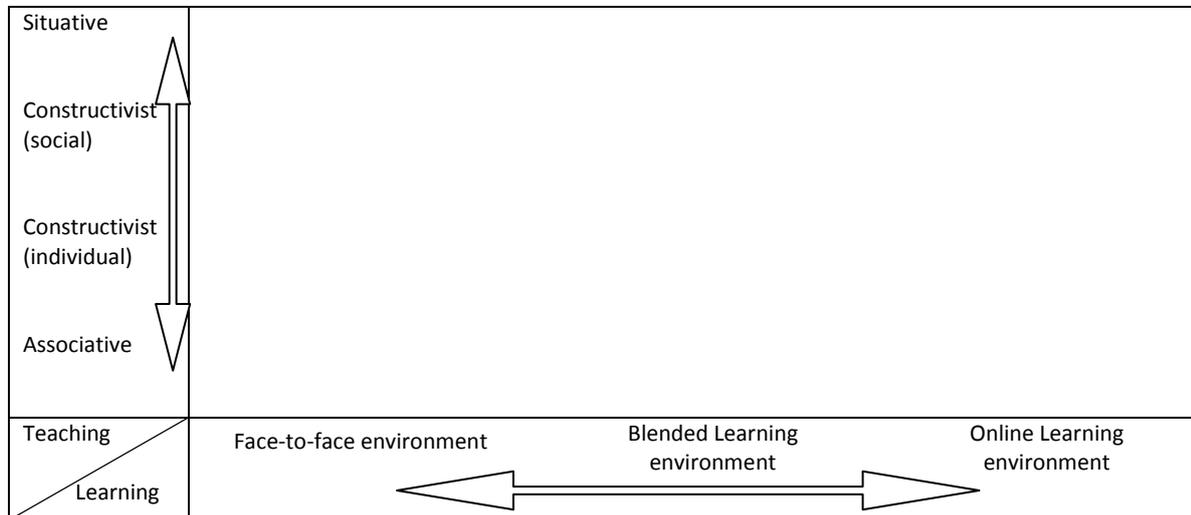


Figure 3 A framework for investigating pedagogic models with the use of online technology

3. Findings: How students' used their pedagogy/technology frameworks

The students' hand drawn frameworks were transferred into Word documents and the originals scanned for archiving. They used their own descriptions for their modules which do not always correlate exactly with the module title. Additionally they include some of their extra study experiences which included, in the case of Figure 4b his student led revision groups, and in the case of the Philosophy and Computer Science students their participation in an online study module for career development called Fit Student. The frameworks are reproduced in the Appendix in Figures 4a-h.

It will be seen from the frameworks reproduced below that most of the students were reporting their learning happening in a blended environment. As mentioned above there were a surprising (to the author) number of modules categorised by the students as being both Associative and in the face-to-face environment. Two of the students acknowledged the predominance of this in their models and said that they 'preferred learning from lectures'.

Much of the learning will however be seen to be taking place in the segments for constructivist models of learning and at the same time using a blended approach of technology with campus-based classes. In fact across the student interviews this is by far the most common experience. There is here conformity and commonality appearing in the students' experiences which reflects perhaps the investment placed on the use of blended learning and the emphasis on the use of online technologies for studying either as collaborative tools or as group projects undertaken by the students

The use of a continuous small community for working together was identified by two of the students (the Psychologist and the Computer Scientist). For each group there was a specific purpose; in the former case it was a group which revised together and collaborated in organising their own revision topics. In the latter example the students had joined the university from their Further Education College where they had previously studied and chose to work together and give it each other 'support', across their different strengths and weaknesses.

4. Discussion

The group of students who participated in the interviews and created their own frameworks of pedagogy and technology had already spent some time reflecting in their diaries (STROLL, 2009) on their use of technology to support their learning and for personal use. This was however the first time that differences in pedagogic models had been investigated. The students showed aspects of both conformity and diversity in their experiences of their learning with technology and their considerations of the different pedagogies they had encountered, all within a university which has been known as a 'blended learning institution'. Blended learning can offer many forms of blending and for these students there was a diverse use of materials online. The students reported in their interviews that they generally relished the opportunity to access their learning at any time and from any where and described leading busy and complex lives. These were often organised through their personal use of technologies such as mobile phones and social networking sites. These might include one or more part time jobs combined into their learning and social mix.

The common factor which united the students' experience was that they took the accessibility of their materials online for granted and for them technology was an integral and accepted part of their lives. They described themselves as 'always connected', via mobile phone or internet connection, even where they did not aspire to own particularly modern technology. It was not just the 'net generation' students who reported widespread use of technology; in earlier interviews the mature students taking part in the STROLL video diaries and aged over 24 at the start of their programmes reported real benefits of using technology to support their learning, even where they had struggled at first to get online. By the end of their diaries they reported how technology had transformed their learning and enabled them to access many more materials than if they had not had access to the MLE.

In terms of the pedagogic models encountered there was some difference between the genders in the preferences expressed for different models of learning. Males were far more likely than female students to express a preference for an Associative approach to being taught, both in the frameworks created by these students and by those in a small pilot study undertaken to test out the framework. This preference for pedagogic model did not link in any way to a lesser ability or lower confidence levels with technology. The female students when expressing a preference were more enthusiastic about the use of constructivist approaches to their learning. This is however only a small scale study at this point and the framework should be tested further to see if it can be applied more generally.

What lessons might be applied for academic practice? While students reported encountering a diversity of pedagogic models in their own experiences of being taught and of taking responsibility for their own learning, there was no definite preference expressed for one clear model. There was however a clear conformity in their use of technology to enhance their own learning, which had first been noticed in the previous research as well as elsewhere (by for example Littlejohn, Beetham and Sharpe). A blended approach for these campus-based undergraduates had very definite advantages and was seen as being a choice for them of participating in a blend which was 'both/and' instead of 'either/or', that is they were being offered their learning through 'both face-to-face and online technologies', instead of having to make a choice between either 'face-to-face' tuition or 'online accessibility'.

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Appendix Figures 4a-4h The student frameworks

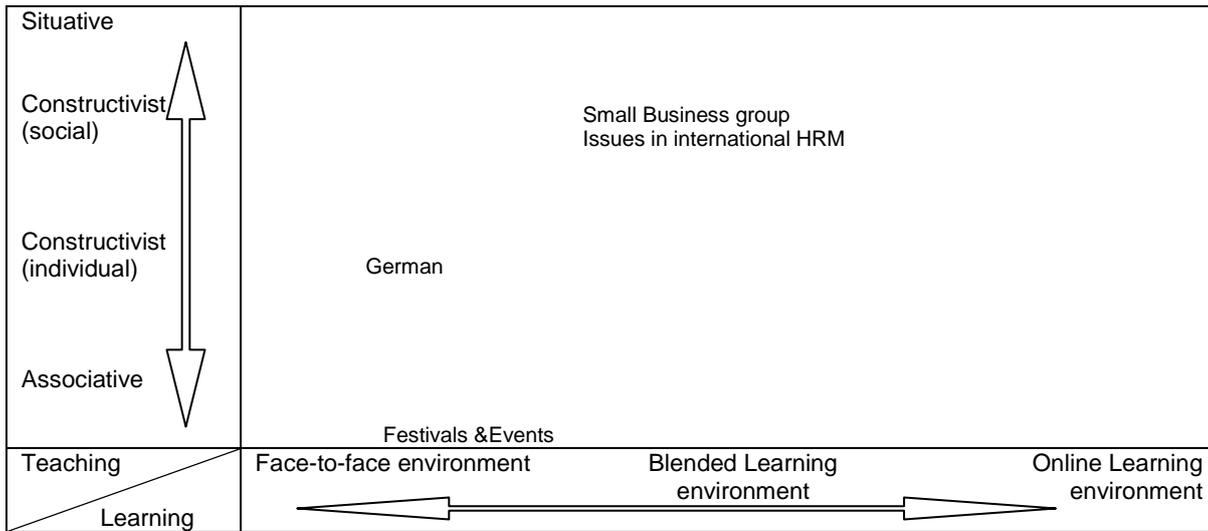


Figure 4a The International Business Student's framework

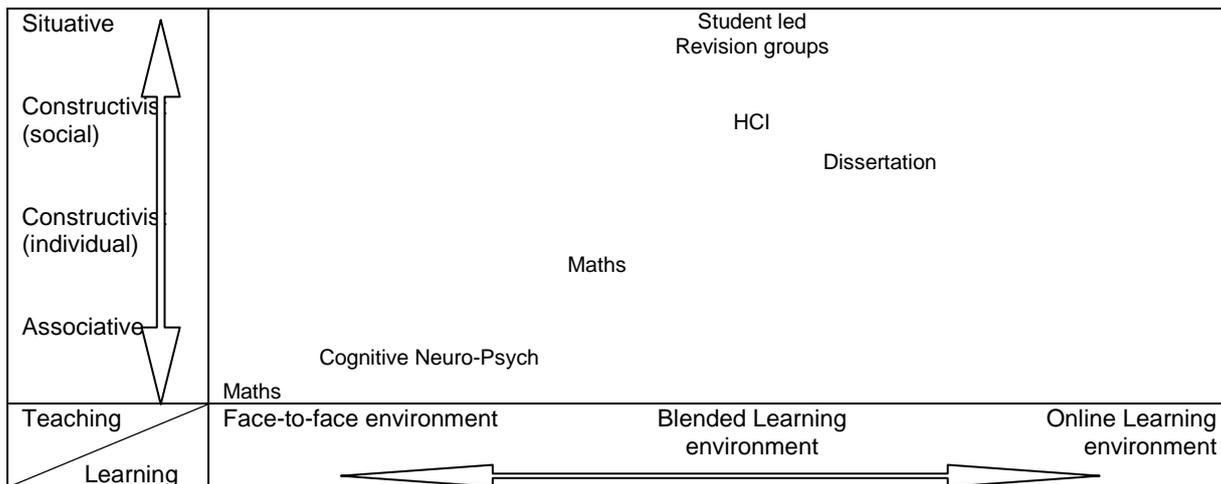


Figure 4b The AI and Psychology Student's framework

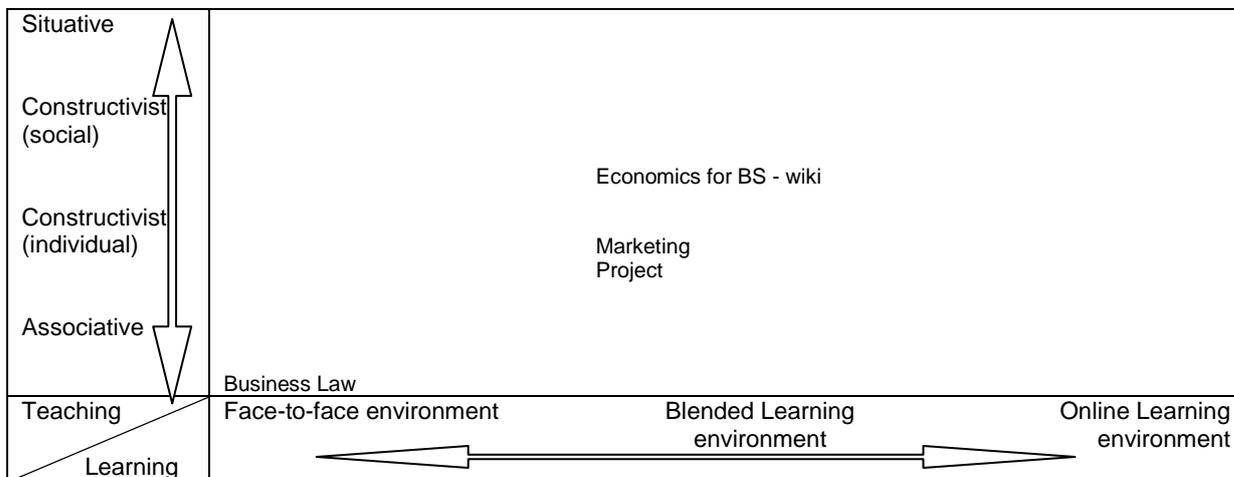


Figure 4c The Business Studies Student's framework

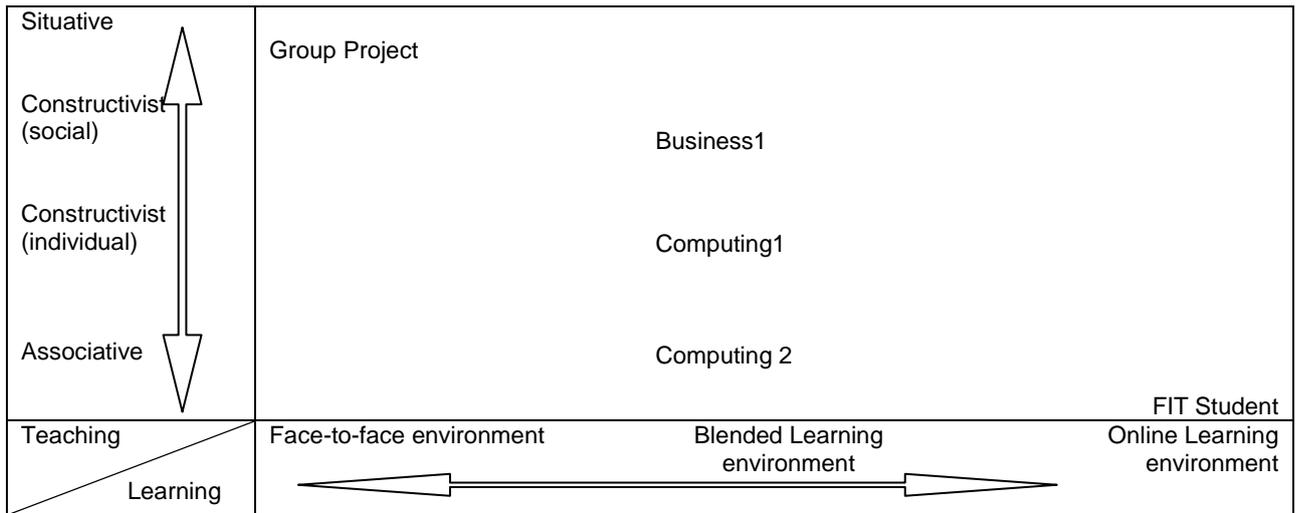


Figure 4d The Computing Student's framework

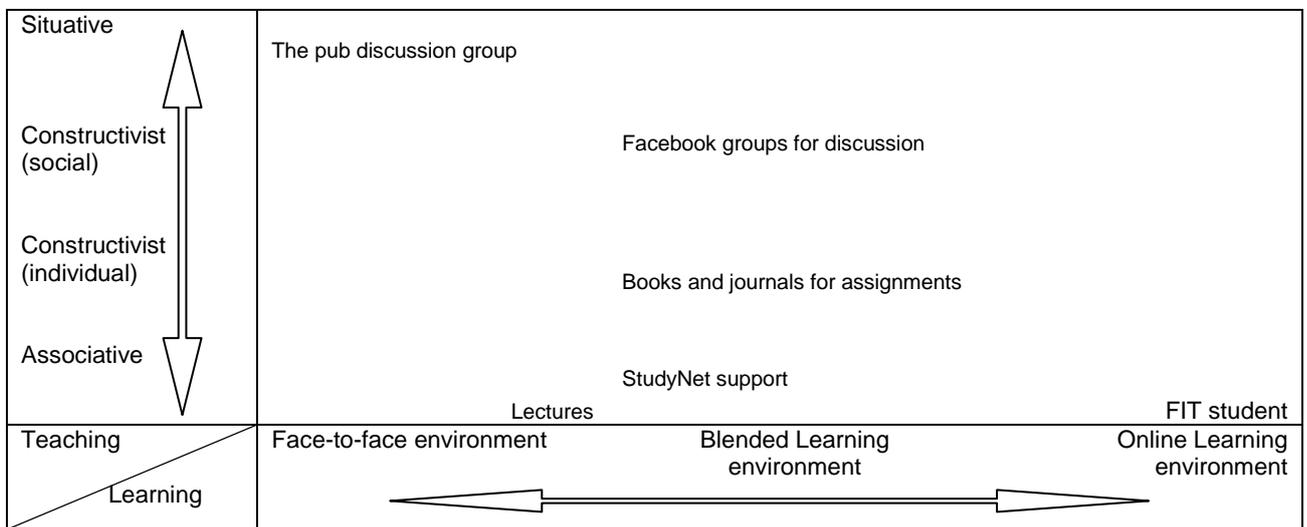


Figure 4e The Philosophy Student's framework

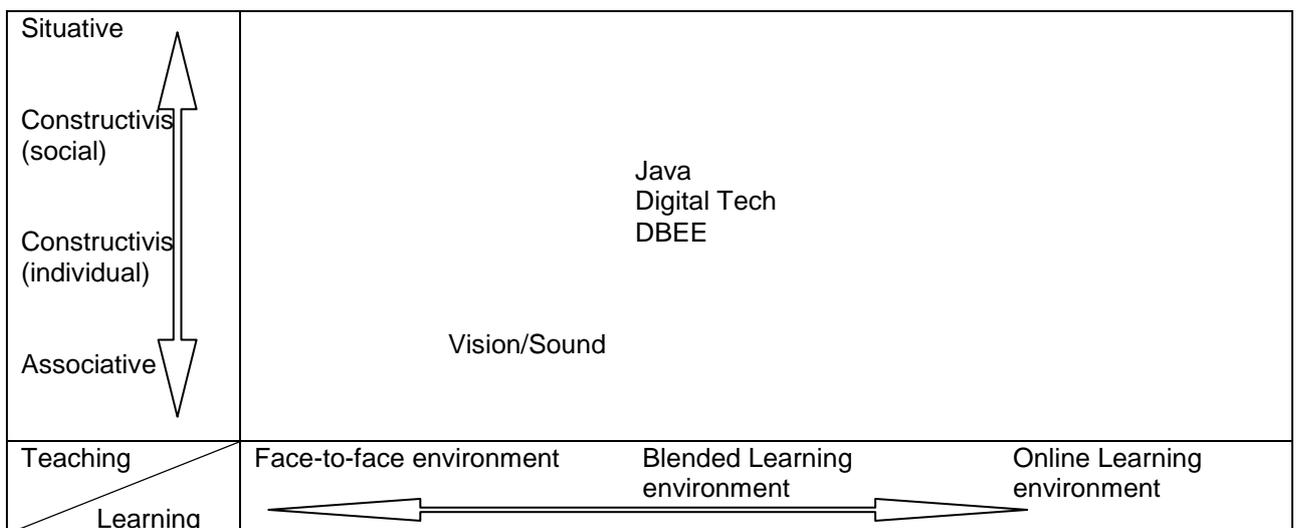


Figure 4f The Graphics and technology Student's framework

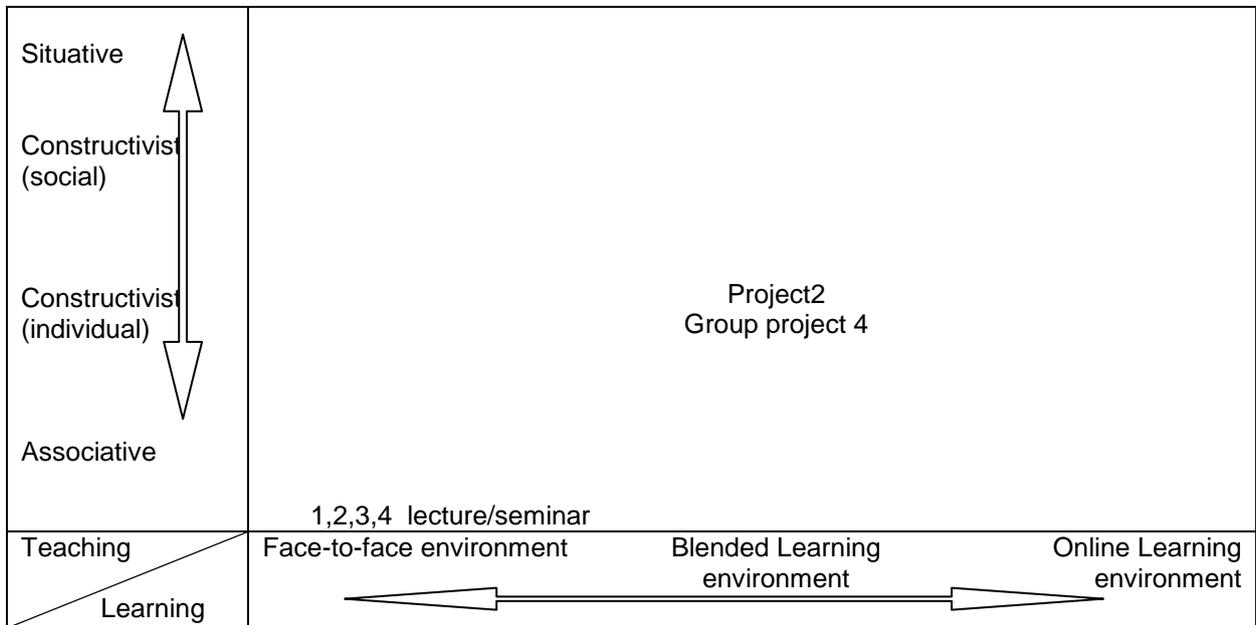


Figure 4g The English Student's framework

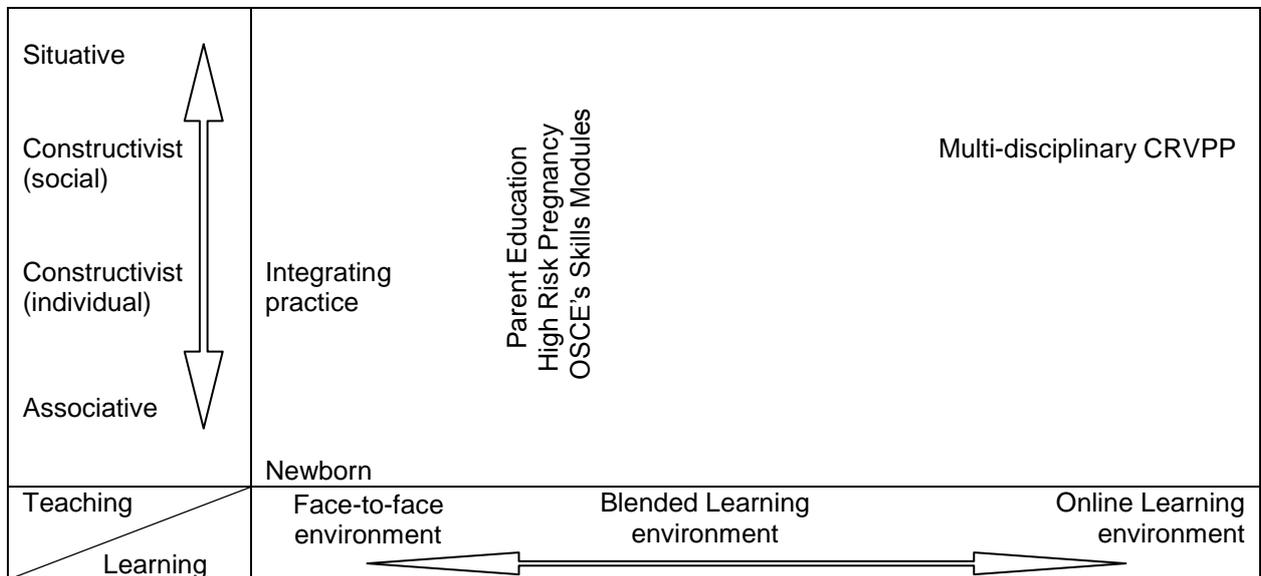


Figure 4h The Midwifery Student's framework