

# **‘The best methods are also the most difficult’: Educational technology and transformation in the University Preparation Program**

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## **Introduction**

[Express appreciation for the invitation to speak on this important occasion and of having an opportunity to describe the University Preparation Programme—commonly abbreviated to UPP.]

The UPP is the outcome of collaboration between King Faisal School and the Institute for Elementary and Secondary Education at Brown University, an Ivy League university in the United States. Mindful of the concerns expressed by the tertiary education sector in this country, King Faisal School, with the enthusiastic support and patronage of the King Faisal Foundation, embarked on an investigation of ways of improving students’ readiness for the rigours of further study. The result was a contract with Brown University, during which two years of research preceded the introduction of a pilot programme at this school. We are currently in the first semester of that pilot phase.

## **The Experience of Melissa and Antony**

Before I describe the curriculum of the UPP, I should like to contextualize the need for such an programme by describing the experiences of two British students. In their book *Understanding Learning and Teaching*, Prosser and Trigwell (1999) take the learning experiences of Antony and Melissa, two first-year students of mathematics. Both students had achieved excellent results in their school mathematics course and had proceeded to university with high expectations of success. Both students were registered on the same module,

shared the same lectures and teachers and wrote the same examinations. Whereas Antony failed to pass a core mathematics subject, Melissa passed the same subject with distinction.

Prosser and Trigwell quote directly from interviews with these students. Melissa described her approach to mathematics as follows:

I am doing mathematics for the purpose of improving a logical method of thinking rather than for the course specific subject matter....Well I think I try to see what is being taught as part of the bigger picture, to see how every thing comes into place and I find if I can get a broad sort of overview of things then it probably helps me to understand the work a bit better, because I can see where it is heading, where it is going to fall into place. (Prosser and Trigwell, 1999:1)

On her approach to studying, Melissa said:

[I] do as many different types of question as I can. Try to see how the topic being studied is related to other topics I have studied .... I like to get an understanding of the principles behind the topic.

By contrast, Antony commented:

I feel mathematics is the process of using different techniques to solve various problems. In my experience this has only involved numbers ... [and] ... getting an actual answer to a problem .... I used to do past papers and plenty of problems and writing down formulae ... in the hope that I'll be able to recall them in an exam .... I'm probably just trying to memorize things ... I don't know if that's a good idea .... (Prosser and Trigwell, 1999: 2)

I cite this example for two reasons: first, to illustrate that the kinds of challenges facing education in this country are not unique and are being

encountered internationally, even in education systems that may seem to be well established and well supported. Second, the story of Melissa and Antony highlights in fairly stark terms the contrasting ways in which students think about and experience learning. Prosser and Trigwell (1999: 3) name these the 'deep' and the 'surface' approach to learning and characterize the qualitative differences as follows:

In ... a deep approach ... students aim to understand ideas and seek meanings. They have an intrinsic interest in the task and an expectation of enjoyment in carrying it out. They adopt strategies that help satisfy their curiosity, such as making the task coherent with their own experience; relating and distinguishing evidence and argument; looking for patterns and underlying principles; integrating the task with existing awareness, seeing the parts of a task as making up the whole; theorizing about it; forming hypotheses; and relating what they understand from other parts of the same subject, and from different subjects....

In the ... surface ... approach, students see tasks as external impositions and they have the intention to cope with these requirements. They are instrumentally or pragmatically motivated and seek to meet the demands of the task with minimum effort. They adopt strategies which include a focus on unrelated parts of the task; ... a focus on what are seen as essentials (factual data and their symbolic representations); the reproduction of the essentials as accurately as possible; and rote memorizing information for assessment purposes rather than for understanding. Overall they would appear to be involved in study without reflection on purpose or strategy .... (Prosser and Trigwell, 1999: 3)

It is clear from this example and from a reflection upon our own experiences that we are part of an exciting international reconsideration of how well our education systems are meeting the needs of their customers, the students and the societies in which they must live and work. Such a reassessment

involves issues of epistemology (how we know), of theories of learning (from objectivism or behaviourism to constructivism) and of curriculum (in which we have content models, process models and situational models, to offer three possible ways of looking at curricula). Coming from South Africa, where there has been a ferment of educational re-evaluation for at least the past fifteen years and where the country has tried to introduce enormous changes across throughout the country without the financial or human resources needed to support such changes, I am impressed by the systematic and cautious but determined way in which the UPP has been introduced in this School.

To return to the experiences of Antony and Melissa, it is important to realize that these could equally have been the stories of Ali and Badria. There is a common humanity that is embedded in their experiences and the question that faces us is in what ways can the (or a) UPP help Ali an Antony become like Badria and Melissa. In particular, in view of the focus of this symposium, we should concentrate our attention on ways in which the integration of educational technology in the UPP can help to make Ali a successful learner.

## **The UPP Curriculum and Educational Technology**

In a constructivist learning environment, both the teachers and their students are learners. The notion of the teacher as an authority figure (in both a content and a disciplinary sense) is replaced by one of open-ended enquiry and discussion. Higher-order skills are stressed, so that great weight is given to analysis, synthesis and evaluation. The big picture, as Melissa described it, is preferred to a search for 'an' answer. Student autonomy and initiative are encouraged and appropriate strategies are explored, in both individual and group work conditions.

These are among the core features of the UPP classroom. Being for the most part project-based, the UPP opts for depth not coverage and spends approximately six to seven weeks on a single 'essential question', from which

most of the students' activities emerge. This essential question should be authentic, by which we mean that it should arise from real life and be of concern to students; it also entails authentic assessment in which criterion referencing is preferred to norm-referencing.

Given the large degree of autonomy granted to students, technology plays an important part in the learning process. The UPP classroom is equipped with laptop computers with Internet access. As Armitage (1999: 126) points out, this kind of learning is heavily resource-based and as such 'poses enormous problems for students without information-handling skills'. To overcome this obstacle, especially in a context in which students are accessing information in a language that is not their native language, great emphasis is placed in the UPP on providing an English-intensive learning environment. When searching for information or data on the Internet, teachers provide the scaffolding that is the *sine qua non* for successful use of the vast, complex and daunting resources of the worldwide web. Among these are regular exercises in skimming and scanning, summarizing, extracting key concepts and main ideas, analysing and then synthesizing. These skills are developed in order to avoid the all-too-easy option of cutting and pasting from websites, a practice that will get students into trouble at college as it is plagiarism. More important, for our purposes, is the fact that no learning takes place if there is no reflection.

Technology is not merely a means of accessing information, however. It is also a resource for the compilation of reports, essays and presentations. With this in mind, UPP students use their computers

- to store notes and drafts of their work, to receive feedback from teachers, either via e-mail or by means of comments added to the documents
- to use software that is appropriate to the task; for instance Inspiration is being used at present to give students experience in brainstorming and then organizing ideas, either in mind-maps or in linear formats

- to re-work and finalize their presentations or projects, which are always the end-result of an essential questions
- to compile appropriate scripts for video or other presentations
- to prepare PowerPoint presentations, and
- to learn to work in groups and to arrive at consensus by means of social discourse, such as dialogue and debate.

In all of these activities, which comprise at least half of each day's 90-minute class, the UPP strives to give effect to clear principles in the utilization of learning resources. Four of these are lucidly described by Armitage (1999: 127):

- Relevance is crucial. Skills are developed using realistic and purposeful tasks, not little 'made-up' exercises, Skills need to be 'built into' course-work, but not buried in it. Skills development doesn't take place where skills are invisible to the students using them ... [Mention UPP Core Principle of **transparency**.]
- Students need to use their skills, to reflect on what they have done and then try out improved strategies. Students react badly to being told the 'right way' to take notes, write essays, etc. They need support as they examine their existing study skills and strategies and work out how to make them more effective. [Refer to constructivist principle of starting with what students already know about a topic and letting them work from there, constructing their knowledge.]
- Effective use of study skills needs to be valued in assessment and direct feedback on the use of such skills should be given to students.
- A variety of teaching approaches is needed to suit different styles of learning.

## **Caveat**

Selwyn (2000: 172) reminds us that 'access to information means little without guidance in learning to use information'. We are all familiar the phenomena of 'mental gridlock', of being lured by tempting but irrelevant sites and of being overwhelmed by the sheer volume of the technological and related resources. As with all kinds of technology, there is also what has been labelled the 'Everest Syndrome', which is encapsulated in the injunction, 'Let's use it because it's there'. (See Selwyn 2000, p. 182.) Commenting on the creation of resources for use in a technologically up-to-date environment, Armitage (1999: 96-97) states with total honesty that:

The production and development of learning resources can be one of the most creative and satisfying aspects of our professional lives. However, it must be accepted that in many cases there is no formal or organized attempt to assess the effectiveness or even the appropriateness of these resources.

To this I would add from my experience both here and in South Africa that commitment, both financial and pedagogic, to all varieties of technological and e-learning facilities involves substantial allocation of resources. This commitment will be to no avail if the fundamentals are unhealthy or there is a less than wholehearted subscribing to the culture of learning which is a prerequisite for success. If a culture of learning and diligent application to study is absent, no amount of technology will rectify the situation.

## **Conclusion**

It may appear that I have spent more time discussing curriculum and principles than in talking about the use of technology and e-learning in the

UPP. This has been a deliberate choice. The title of this talk, a quotation from Piaget, reflects my view that an enriched technological learning environment can succeed only in conditions where it is recognized that creating optimum conditions for learning is a difficult undertaking and that much more is involved in this endeavour than equipping every classroom with computers and Internet access. We need, first, to change the way teachers conceive of their roles. As Lawrence Stenhouse put it more than a quarter century ago,

... it is not a simple change of heart that is needed in schools. It is a change of organization and pedagogy which is founded on a development of the professional skills and knowledge of teachers. Morale is founded on professionalism. (1975: 167)

And then, second, we need to work to ensure that students see themselves as active, willing partners, not recipients, of this learning. Stenhouse again:

... curriculum changes involve changes in the entire tone, code or ethos of the teacher-pupil relationship. (1975: 167-68)

It is to this kind of transformation that the UPP, its staff and students is fully dedicated and in which educational technology plays an indispensable role.

## **Appendix: Moursund's PBL from two points of view**

### **1. Student**

- Learner-centred, intrinsically motivating
- Collaboration and co-operative learning
- Incremental and continual improvement
- Actively engaged students
- Product, presentation or performance
- Challenging, with a focus on higher-order skills

### **2. Teacher**

- Authentic content and purpose
- Authentic assessment
- Teacher facilitated
- Explicit educational goals
- Rooted in constructivism, but uses multiple methods of instruction
- Facilitates transfer of learning
- Teacher as learner

(See Moursund 2003, pp. 12-16)

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