

# ENHANCING ONLINE LEARNING: DESIGN PRINCIPLES FOR MORE EFFECTIVE EDUCATIONAL WEB FORUMS

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## Abstract

Online educational web forums are increasingly being used in tertiary education settings to either supplement or replace face-to-face teacher-learner interactions. However, much use of such forums tends to be ad-hoc and ineffective which invariably results in dismal learner participation levels. This paper reports on a research inquiry into the design principles of an effective and strategic use of educational web forums within particular coursework contexts and in relation to a range of possible learning outcomes. It focuses on the design challenges of two key issues. The first is the inherent communication limitations as well as opportunities represented by typical web forum functions. A second related issue lies in the challenge of reconciling in practice both participant-related factors and course-design related factors. Participant-related factors include personal profiles, prior learning experiences and educational perspectives. Conversely course-design related factors include the quality and quantity of assessment items, the communication of course requirements and the underlying approach to learning and online facilitation. This research explores how a more strategic negotiation of the intrinsic and extrinsic factors of coursework participation can form a design basis for more effective online learning and active learner participation.

Keywords: e-learning, web forums, educational design

## 1. INTRODUCTION

There has been an explosion in the use of e-learning within higher education contexts around the globe. This has been matched by a significant enrolment growth, as well as associated increases in online course offerings, technology spending, and resulting revenues in vocational, college, and corporate training as well as university settings (Bonk, 2004). The projection ahead is even more buoyant, with an OECD report estimating that there will be from as many as 30 to 80 million online students worldwide by 2025 (Bell, Bush, Nicholson, O'Brien, & Tran, 2002). This growth trend is also reflected in the tertiary education sector. Data from a study of nineteen tertiary education institutions in thirteen OECD countries supports this (Centre for Educational Research and Innovation, 2005).

The prevalence of online learning in tertiary education settings does not necessarily translate into an optimal use of the medium for active learner engagement. The main aim of this research study was therefore to investigate the coursework design factors and principles of active participation in educational web forums. To do so the study particularly focused on the motivations and learning habits of those e-learning students who more 'actively' engage with the material, instructor and other students in interactive and meaningful ways. In this way the overall project was conceived to identify the key principles and factors which might enhance online learning.

The discussion of this paper is organised around three sections. The first section focuses on the *course-design* related factors which were explored in the literature review phase of the project. The second section links these factors to the participant related factors, which were the focus of surveys and related semi-structured interviews of 'active' participants of one e-learning cohort at an Australian university. The third section outlines convergent principles of course participation which might be observed by educators wanting to design, organise and facilitate more effective educational web forums. It does so on the basis of how the initial sections outline an interplay of both intrinsic and extrinsic factors of actual coursework resources, activities and related virtual interactions.

## 2. EDUCATIONAL WEB FORUMS AND COURSE-DESIGN FACTORS: A REVIEW OF THE LITERATURE

Despite the widespread adoption of Learning Management Systems (LMSs) in tertiary institutions worldwide, some contend that not enough thought has been given to utilising the tool for maximum pedagogical impact (Govindasamy, 2002; Sridharan, Deng, & Corbitt, 2010). This is reflected in the fact that research regarding its use has often been limited to an examination of economic and technical issues, to the exclusion of pedagogic ones (Coates, James, & Baldwin, 2005). What is required is a more critical and in-depth focus on sound design principles, with a view to enhancing active student engagement.

The use of LMSs as a tool in itself does not guarantee that deep and meaningful learning actually occurs. Arguing this point, Govindasamy (2002) maintains that LMS vendors deliberately distance themselves from pedagogical issues, often adopting an indifferent attitude. The problems as enumerated by Bonk, Wisher and Lee (2004), are that they do not foster student reflection, metacognition, interdisciplinary learning, collaborative knowledge building or higher-order thinking.

Furthermore, the fact that the online learning environment is essentially a text-based one implies weaknesses inherent in this form of communication. For instance, written communication is termed a 'lean' medium because much of the information that creates and sustains the dynamic of face-to-face groups is simply not transmitted (Garrison, Anderson, & Archer, 2000). This limitation presents many obstacles to course conveners who wish to build participation into their educational offerings. Also, it is easy for online learners who participate only intermittently to proceed through the course unnoticed. Usually in face-to-face situations, a student's lack of attendance or participation is obvious. However, this is often not the case in the online forum, leading to the common phenomenon of 'lurking', where such students only read but do not tangibly contribute to the discussion boards. This is generally viewed as a common occurrence in many online discussion groups (Rovai, 2000).

When the critical elements of an online course are based on sound design principles, student participation is optimised. A synthesis of available literature on the topic of effective design principles for online learning revealed six main elements that work together synergistically to encourage student participation when present in the design of a web forum based course. They are a basic epistemology that supports personalised, interactive and contextualised knowledge building; an optimum quantity of assessment items; appropriate grading strategies; the effective communication of course requirements; facilitation to communicate teacher presence; and the cultivation of a genuine learning community. These design principles are discussed under here along with the key elements and authors that informed these principles are summarised in Table 1.

**Table 1: Key influences on online participation**

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| <ol style="list-style-type: none"><li>1. Design elements underpinning philosophy of online courses:<ul style="list-style-type: none"><li>• Active engagement of learners is encouraged (Brookfield, 1986; Clark, 2001; Collis, 1998; Harasim, 1990, 2000; Harasim, Hiltz, Teles, &amp; Turoff, 1995; Huang, 2002; Knowles, 1998).</li><li>• Learners are placed at the centre of the learning experience (Berge &amp; Collins, 1995; Brush &amp; Saye, 2000; Hannafin, Hill, &amp; Land, 1997; Harasim et al., 1995; Rovai, 2004).</li><li>• Interactivity is a key component of teaching and learning (Bonk et al., 2004; Starr, 1998; Woolls, Dowlin, &amp; Loertscher, 2002).</li><li>• Self-directed learning is encouraged (Wulff, Hanor, &amp; Bulik, 2000).</li><li>• Lurking (vicarious learning) is discouraged (Clark, 2001).</li></ul></li><li>2. Allocation of a manageable quantity of assessment items (Bullen, 1998; Cunningham, 2004; Daniels, 2000; O'Brien &amp; Renner, 2002).</li><li>3. Grading formulas are used to reward online participation (Harasim et al., 1995; Jiang &amp; Ting, 2000; Rovai, 2003; Swan et al., 2000).</li><li>4. Course requirements are communicated effectively (Daley, Watkins, Williams, Courtenay, &amp; Davis, 2001; Dringus, 2000; Maor, 2003; Odom, Barnes, &amp; Wicker, 2005).</li><li>5. Facilitation to communicate teacher presence (Gunawardena &amp; Zittle, 1997; Lombard &amp; Ditton, 1997; Starr, 1998).</li><li>6. The cultivation of a learning community (Wegerif, 1998).</li></ol> |
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## **2.1 Key online design factors in e-learning course provision**

A key focus of the literature pertaining to online learning design factors tends to be on the inherent limitations of LMSs. Such limitations include the lack of pedagogical focus in their design (Bonk et al., 2004; Govindasamy, 2002), the inherent weaknesses in the textual communication medium (Garrison et al., 2000) and the ease with which learners who merely read but do not contribute to the discussion boards can get by unnoticed. Thus, the four main areas of purposeful design from which to elicit participation involved the following: the selection of an appropriate epistemology for the course; an increasing awareness of participation requirements; rewarding participation; and applying facilitation techniques to enhance presence. As outlined, these four main areas were also the focus of this empirical investigation of active online learning principles.

### *2.1.1 Selecting an appropriate epistemology*

A review of literature in this area identified that the design of effective learning in the online learning environment had to be underpinned by the: principles of active and tangible student participation (Clark, 2001; Collis, 1998; Harasim, 1990; Harasim et al., 1995); placement of the student at the centre of the learning experience (Berge & Collins, 1995; Brush & Saye, 2000; Harasim et al., 1995); and interactivity (Bonk et al., 2004; Starr, 1998; Vrasidas, 2000; Woolls et al., 2002). Accordingly, a constructivist philosophy informed the design of weekly web forum based activities to encourage students to share their personal experiences and perspectives on various management issues; comment on others' perspectives; and use management frameworks to inform or solve authentic problems. In an effort to discern whether they recognised any benefits derived from the constructivist principles that the course design was based on, students were required to comment on aspects of the web forum question they found effective in helping them to learn about management. The summary responses indicate that most students found the open ended nature of the questions, the emphasis on real world current issues, and the relevance of the questions to their workplaces were the most effective aspects - factors that describe the characteristics of a constructivist epistemology.

### *2.1.2 Increasing awareness of participation requirements*

In order for students to participate in online learning contexts, they need to be made aware of the importance placed on online participation very early in the course. Hence, the requirements for online participation were made clear to students from the outset. A modified version of Rovai's (2004) online participation rubric was placed in a prominent position in the assessment section of the course material on the Blackboard LMS; the specified entry point into the course LMS. This rubric made explicit three levels of posting behaviours and apportioned grades to each level. In our related project (described in section 3.1), students were asked a combination of questions to do with their awareness of online posting requirements for the web forums and the extent that the requirements provided them with the encouragement to participate online. The responses indicated that awareness of online participation was very high among the active students. The findings indicate that providing online participation rubrics are important in enlisting student participation, as students need to 'see' what good participation looks like in order to emulate the posting behaviours.

### *2.1.3 Apportioning grading incentives to online participation.*

The next purposeful design enhancement involved the allocation of grading incentives for online participation, as this was identified in the literature as another important element to engage student participation on educational web forums (Harasim et al., 1995; Jiang & Ting, 2000). The assumption was that students would choose not to participate in the web forums if no grades were assigned to this activity, especially since the course comprised five other assessment items. Given the array of assessment components, a modest mark (10%) was assigned to the web forum activities. The enquiry probed into the extent to which grading incentives influenced student participation in the web forum component. Grading incentives were found by 57% of the active participants to be of little relevance to their superior participation levels in the web forum component, while the remaining 43% admitted to its importance in encouraging online participation.

The tendency to increase student workloads with the incorporation of new technology to the detriment of online participation has been reported in various research studies (Daniels, 2000). The demands of regular and sustained engagement with the course content, peers and facilitator does give online courses a certain rigour often lacking in face-to-face classes where students tend to 'study' only just before major assessment items are due. This helps to dispel the misconception that online courses

are a 'soft option' and 'poorer cousin' of face-to-face ones. On the other hand, course convenors need to resist the temptation to bombard students with 'busy work'. Instead, what is needed is a realistic assessment of the core learning objectives for the course and to translate these into an achievable quantity of assessment components. In addition, despite the excessive workload, many of the active participants were able to successfully utilise adaptive metacognitive strategies to excel in the course requirements. Findings here suggest that members of this group of students were able to strategically reduce the quantity and quality of engagement with the course in order to cope with the excessive workload, while still qualifying as active participants.

#### *2.1.4 Facilitation*

When students were asked to identify those behaviours of the online instructor that encouraged them to participate in the web forums, two major themes emerged. These are linked to two of the four main online facilitator roles identified in early literature on the roles of the online facilitator; namely those of the social and the intellectual roles (Berge, 1995; Mason, 1991; Paulsen, 1995). The social role includes the demonstration of the skills that help to foster a learning community; while the intellectual role is more of a task/pedagogical nature (Berge, 1995). A robust 57% of active participants identified social related factors (instructor presence factors such as providing encouragement to students as well as showing enthusiasm) in their responses. The remaining 43% found intellectual related factors (preparing weekly discussion summaries, linking discussions back to theory and encouraging lateral, analytical thinking) useful for their learning of the subject matter.

For the cohort studied, these responses reveal the tremendous value that online students place on the social presence created by online facilitators who are accessible, responsive, encouraging and enthusiastic. These social roles, as named by the students, should therefore be used by course convenors to educate online teaching staff about how to interact with students in their online courses. The other crucial role identified by the students is the intellectual role which involves creating meaning from discussions. Course convenors thus need to emphasise to educators that their teaching role should be modelled on that of the 'guide-on-the-side' as opposed to the more traditional 'sage on the stage' (Barr & Tagg, 1995).

### **3. THE CHALLENGE OF RECONCILING PARTICIPANT-RELATED AND COURSE DESIGN FACTORS: LINKING PERSONAL EPISTEMOLOGIES AND INTERACTIVE LEARNING DESIGN PRINCIPLES**

Student learning expectations may be changed to align more closely with the constructivist pedagogy of web forum based learning for more active online participation. Studies have shown that student's epistemological beliefs are not static (Perry, 1968; Schommer, 1993). Perry's (1968) study of Harvard University undergraduates suggested that students go through stages of development of epistemological beliefs. In the early stages, students see knowledge as either right or wrong and believe that authority figures know the answers. When students reach the late stages of development, they realise the multiple possibilities for knowledge authority. If made explicit to the students that the latter stage of development is something to strive for at university, it is more likely that they will expend the effort to achieve this. Additionally, the inclusion of implicit 'personal epistemological' learning outcomes alongside the more explicit learning outcomes in the design of educational web forum activities will serve to achieve this objective. For instance, an interesting and powerful technique to heighten a student's awareness of the desired epistemology is the use of a metaphor as an initial web forum activity. Crotty (1998) explains that metaphors have their place in allowing a break with conventional ways of seeing and describing things. It should be reinforced to the students that behaviours such as articulating, defending, re-examining, and claiming points of view are expected; and that web forums provide a conducive environment for them to practise these skills within the context of a supportive learning community, thereby modelling discipline-based expertise and epistemological thinking; attributes which can facilitate a student's epistemological development (Hofer, 2001).

#### **3.1 Project research design and participants**

This research project focused on the design implications of the interactions of active participants viewed in a wider cohort context. Active participants were selected based on their tangible online presence on the discussion board of introductory undergraduate management course, as ascertained six weeks into semester. These students' discussion posts were captured on the web forum site and

provided the source of physical artifacts for the study (Yin, 2003). These posts were evaluated weekly using a modified version of Rovai's (2004) online participation rubric. Students identified as 'active participants' were those who consistently attained posting behaviours described as 'superior' according to the rubric, while the less active participants were those who did not achieve this high standard according to the rubric. Of the initial enrolment of 69 students, 30 students consented to becoming involved in the study as they followed through with the course requirements. The majority of the remaining 39 students either withdrew their enrolment or declined involvement in the study.

The first phase of data collection involved the administration of questionnaires via email in the sixth week of semester to both the more active participants and their less active counterparts. This was mainly to gather demographic and background information to contextualise the study. The questionnaire comprised mainly multiple choice questions. The second phase of data collection focussed on the primary research participants. This involved the administration of semi structured email survey instruments in the eighth week of semester, supplemented with follow up telephone interviews in the 11th week to seek clarification on information provided superficially.

Ten out of the fourteen active participants (71%) did not have any prior experiences of online learning. Of the remaining four, three had studied between one and four prior 'online courses' at the same institution. However, although marketed as 'online courses' these did not utilise the interactive features of the medium, only using it to display course material. The only student who had studied a fully interactive online course with an external professional body, indicated that the biggest impact of this prior experience on her current online participation in the course was the importance of self-motivation.

Half the participants expected that they would have to memorise facts in order to do well in their studies. The specific responses suggest that the students' educational experiences encouraged and rewarded the ability to memorise facts, in particular for examinations. Being cognisant of expectation, implies that educational institutions need to be clear about the types of learning behaviours that they aim to encourage. Learning for the Industrial Age entailed the memorisation of facts, which then had to be reproduced in an examination setting. For the Information Age, with its super abundance of information, the emphasis should be on the ability to locate, evaluate and find meaning in the information in order to apply it to improving practice. It is clear that online courses should be designed to reflect this reality. With respect to examinations, the emphasis should be not so much on regurgitating memorised facts as on applying learnt concepts to different scenarios.

## **3.2 Participant related factors which influence students' online interaction**

Five main kinds participant related (i.e. personal) factors were found to influence students' online participation. These factors were derived from isolating major themes from the active participant responses. Specifically, they are the students' motivation for learning and achieving high grades, their learning preferences, ability to express ideas through written words, home internet access and personal epistemologies.

### *3.2.1 Motivation for learning*

The majority of active participants were driven either by their pursuit of knowledge and/or career advancement. The themes emerging from the main points of responses for 'pursuit of knowledge' reveal the participant's intrinsic motivation to be cognisant of their operating environment and the value placed on vicarious learning. Furthermore, the themes that emerged under 'career advancement' revealed career imposed hurdles as the main extrinsic motivator for learning and eventually obtaining their paper qualifications. It is clear from these results that institutions need firstly to make a concerted effort to align their online pedagogy to reflect the 'real world application' as well as to legitimise the sharing of participants' knowledge and experiences in order to satisfy these intrinsic learning motivators. Institutions also need to recognise and reward the participants' desire for career progression through formal study by providing them with tangible acknowledgements of their participation in the online course which they can present to their employers.

### *3.2.2 Motivation to achieve high grades*

When asked how important it was for students to achieve high grades for courses studied, 64% of the students responded that they regarded it to be of high importance. The reasons for this varied, with the majority of the responses indicating that the grading received for a course was a valuable measure of learning. This shows the pursuit of high grades represents a strong intrinsic motivator for their

learning efforts. Armed with this knowledge, institutions must ensure that the online assessment composition for their courses accurately reflects required effort.

### *3.2.3 Learning preferences: Interactive vs. independent learning*

The results showed that all but one of the active participants valued learning through interaction. However, there were differences on the emphasis placed on this value. For instance, one group of participants expressed clear preference for learning through interaction to the exclusion of all other methods of learning. Another group, while valuing interactive learning, placed an equal emphasis on solitary learning. The third group of participants moved from a solitary style to a more interactive style as they progressed through the course. Interestingly, when students were asked their opinions on whether most people learnt best by themselves or through interaction, the overwhelming majority felt that interaction was the way in which most people learnt. It could be suggested from the responses that the aspect of interactivity is a crucial factor and therefore an intrinsic motivator for many students who 'buy into' online learning.

### *3.2.4 Ability to express ideas through written words*

Both the active and less active web forum participants were asked to rate their ability to express ideas through written words. All of the active participants rated themselves as being fair, good or excellent in this ability as contrasted to only 75% in the less active participant category. The remaining 25% of the less active participants rated themselves as not being confident.

The comparative data indicates that a student's self-perception of ability to express ideas through written words is positively related to the actual involvement on the web forums. Thus it is important for course convenors to assess both actual and perceived written language ability early on, and to make a deliberate effort to target such students with added encouragement and support.

### *3.2.5 Ability to log onto the internet at home*

The students were asked whether they were able to log onto the internet at home in order to complete their coursework. A significant proportion of active participants (86%) were able to do so, as compared to only 63% of the less active participants. Hence, it may be inferred that a greater access to the internet at home presents more opportunities for students to participate online. The question of home internet access is a multi-faceted one that encompasses equity issues (whether students can afford to own a computer and pay for internet connections) and the number of home inhabitants vying for the use of the facility.

## **4 DISCUSSION: IMPLICATIONS AND DESIGN REQUIREMENTS INFLUENCING ACTIVE PARTICIPATION**

### **4.1 Engaging with 'active learner' principles**

By exploring the active students' prior experiences, learning expectations and factors and their responses to the course design factors, we are able to more effectively link coursework design factors and participant related factors. On this basis we identified three key convergent design factors

#### *4.1.1 Changing student expectations to encourage active online participation*

Based on the active participant's responses and strong presence in the web forums, a general speculation can be made about how to change student learning expectations for more active online participation. Most of the active participants in the study shared common beliefs about the nature of knowledge and learning which aligned very closely with the constructivist pedagogy of web forum based learning. Specifically, the majority of the 14 students acknowledged the importance of interaction, the valuing of open ended questions, the emphasis of real-world current issues and the relevance of the web forum questions to their work. It is surmised that students who view knowledge as something to be acquired rather than constructed would place little value on discussion activities and accordingly withdraw or minimise their participation; or worse still, participate perfunctorily. Accordingly, it is reasonable to speculate that such students will need to have their learning expectations reshaped either before embarking on online studies or very early on in the course.

Another finding is that some online learners will initially participate online only if it is a formal requirement to do so. However, once they begin to experience the benefits of engaging in web forum activities, their expectations change and they 'buy into' this mode of learning.

#### *4.1.2 Designing for active engagement*

In designing requirements which influence active participation in educational web forums, course convenors must aim to counteract the strong influences of prior passive learning experiences on a student's present engagement in web forum based learning. This issue was illuminated in findings which revealed that the students' prior passive learning encounters were tainting their perceptions about the active role that they were required to embrace in the online learning process

The implications for educational institutions are twofold. Firstly, they must ensure that all online courses are developed using constructivist design principles to optimise student-student and student-teacher interactions. Secondly, there is the need for institutions to standardise the development of online courses according to these constructivist design principles. This can readily be achieved through the implementation of an institution-wide online learning strategy that is enforced at all levels. The fact that online course development is often haphazard (Bonk et al., 2004; Bowles, 2004; Stella & Gnanam, 2004; Symonds, 2001) may be symptomatic of the general decline in any form of institution-wide online learning strategy across the board, as evidenced by a recent OECD study of 13 countries (Centre for Educational Research and Innovation, 2005, p. 13). By adopting pedagogically sound principles such as in the development of online courses and implementing them strategically and corporately, students might be encouraged to expect to participate online, and indeed seek such courses for the interactive benefits that they offer.

#### *4.1.3 Designing to motivate*

When designing for active participation, course convenors need to address both intrinsic and extrinsic student motivators. As revealed in the findings of this study, intrinsic motivators imply the importance of designing web forum activities which address the students' inherent needs to experience 'real world applications' and to legitimise the sharing of participants' knowledge and experiences. Likewise, extrinsic motivators, as revealed in the findings, imply the need to harness this work imposed motivator by making the achievement of course outcomes more tangible to employers for instance.

Another motivational consideration when designing for active participation is in understanding and harnessing of students' motivation to achieve high grades. This is based on the findings, which revealed that many students were driven to achieve high grades for courses studied because grades were regarded as a tangible measure of successful learning. Specifically, course convenors need to ensure that grading for web forum participation accurately measures genuine learning and rewards the effort expended by online learners.

The final motivational consideration when designing for active participation is in the area of student preferences for interactive learning. The majority of participants reported that they believe that interaction was the way that most people learnt. This leaves little doubt to the fact that interactivity is an intrinsic motivator for many students who 'buy into' online learning. Accordingly, course convenors need to incorporate interactivity into the design of online courses. As discussed in the literature, the concept of interactivity must be broadened to include learner-content, learner-instructor and learner-learner interactions (Moore, 1989). For example, incorporating engaging and interactive design interfaces based on pedagogically sound principles (learner-content interactions); applying best practice facilitation techniques (learner-instructor interactions); and designing for collaborative and team-based assessments (learner-learner interactions).

#### *4.1.4 Designing to enhance perceptions of ability*

Findings from this study suggest that a student's self-perception of his/her ability to express ideas in writing is a predictor of their actual involvement in the web forums have several design implications for course convenors. Firstly, web forum posting activities need to be scaffolded in such a way that activities become progressively more challenging with time to allow students to gradually gain confidence in their ability to express ideas in writing. For instance, in this study the initial web forum activity required students to post a brief message describing their favourite place along with a recent photograph. This relatively simple posting exercise was superseded by weekly activities that increased in conceptual and technological sophistication over time. Secondly, attentive facilitator interventions, such as providing timely and positive comments directed at students who seem to be lacking online confidence, will undoubtedly encourage such students to become more active participants in educational web forums.

## **4.2 Design requirements to strategically negotiate the interplay of intrinsic and extrinsic factors of e-learning interaction**

The connection between course design and participant related factors in online learning provides a means of recognising that the key to enhancing online learning is recognising that there is an interplay of intrinsic and extrinsic factors of e-learning participation and interaction. This is especially so in relation to the use of educational web-forums. On this basis we might identify five key design requirements for enhancing the interactive communication dimensions of online learning.

First, the adoption of web forum learning activities in online courses needs to be underpinned by constructivism as a fundamental design requirement. This is based on the findings which distilled the specific characteristic of the web forum questions which positively influenced participation; namely open-endedness, emphasis on current issues and relevance to students' work. These principles are in accord with literature that advocates placing students at the centre of the learning process (Berge & Collins, 1995; Brush & Saye, 2000; Clark, 2001; Harasim et al., 1995) and emphasising contextualised knowledge building (Brookfield, 1986; Hannafin et al., 1997; Knowles, 1998). Collectively, these constructivist principles influence active participation in educational web forums by appealing to the students' intrinsic desire to engage with the material and with each other.

Second, it is important that research-grounded online participation rubrics serve to positively influence active participation in educational web forums. The findings of this study showed that the awareness of Rovai's (2004) online participation rubric was very high among the active participants in the study. This highlights the importance of incorporating such rubrics into web forum based learning environments to enable students to conceptualise and emulate good posting behaviours. Such rubrics can also be customised to suit assessment purposes. In this study, the participation rubric was modified to assist the ongoing weekly assessment of each student's participation by attaching appropriate numeric grades to each column of the rubric to align more closely with the university's numeric grading system. In so doing, the online facilitator was able to monitor each student's progress over time with relative ease.

The third design requirement is the appropriate use of grading incentives to encourage online participation. Slightly more than half of the active participants downplayed grading incentives as an important factor in encouraging their online participation in favour of intrinsic factors such as self-efficacy, motivation to learn the material and motivation to interact with others. The remaining students revealed that the grading incentives derived from participating online were a positive influence on their initial and ongoing participation levels. This is in partial alignment with the relevant literature which argues that grading strategies have an important role to play in engaging active participation in educational web forums (Harasim et al., 1995; Jiang & Ting, 2000; Rovai, 2003; Swan et al., 2000). Nevertheless, in recognition of this, the need for assigning grading incentives for active web forum participation becomes apparent.

The fourth design requirement is for course convenors to be realistic in their estimation of the core learning objectives for a course and to translate these into a quantity of assessment components that a student can reasonably be expected to complete in the short space of a twelve week teaching semester. In the same vein, course convenors need to be able to critically evaluate the online workload at the end of a study period, and be willing to 'trim away' unnecessary or excessive course components for the following iteration. This will help to minimise the destructive effects of an excessive workload in educational web forums as highlighted in the literature (Bullen, 1998; Cunningham, 2004; Daniels, 2000). The findings of this study confirmed these issues to be legitimate ones. Aside from this, an interesting finding was that despite this universal acknowledgement that the workload was excessive, the active participants were able to overcome this hurdle by applying advanced metacognitive skills like practising time management strategies and prioritising tasks according to their level of importance. Consequently, it is reasonable to recommend that course convenors allow legitimate venues for metacognitive skill sharing through the use of the web forums, thereby enhancing overall online participation.

The final design requirement is to incorporate effective online facilitation. The literature has outlined four roles played by an online facilitator. They are the social, intellectual, organisational and technical roles (Berge, 1995; Mason, 1991; Paulsen, 1995). The findings of the study left a strong impression as to the high value that students place on the social role of the online facilitator. Also emphasised by the students was the intellectual role, which involved helping students to create meaning from the web forum text. The primary implication here is the need for course convenors to impress upon future and

existing online facilitators the importance of trading in the 'sage on the stage' teaching model in favour of the 'guide on the side' one (Barr & Tagg, 1995; Frand, 2000).

## 5 CONCLUSION

This paper reported on a research inquiry into the design principles of a more effective and strategic use of educational web forums within a particular undergraduate online course. This study aimed to answer the question, "What are the transferable design characteristics for effective online participation in educational web forums and e-learning generally?" It did so using a case study approach to examine the perspectives of a cohort of active participants studying an online undergraduate management course.

This study investigated active participants' prior experiences, expectations and factors which may have influenced, helped or hindered participation. It found that online learners may be hindered by the 'objectivist baggage' they receive through prior educational encounters that enforced that passive knowledge assimilation equates to learning and negative self-perception of the ability to express ideas through written words. However, factors such as strong learner motivation to experience contextualised, student centred and community based learning can have a pronounced effect on overcoming these initial setbacks. Online participation can be enhanced by designing for active engagement and appealing to a variety of students' intrinsic and extrinsic motivators. Appropriateness of constructivist design principles for web forum questions such as open-endedness, contextual relevance and student centeredness were also explored. The findings from this research study endorse the applicability of research grounded online participation rubrics, grading incentives, assigning realistic student workloads and effective online facilitation for enhanced online participation.

Finally, the issue of changing student expectation in order to encourage more active online participation was investigated. Recognising that all learners engaged in online learning have differing personal epistemologies, which may not necessarily emphasise active participation, it is reasonable to infer that the key to engaging online participation lies with the role of online designers in framing learning activities that progressively encourage students to approach learning in a more constructivist mode. This entails the careful design of web forum activities that are not only purposefully open ended and interesting, but also contain implicit learning outcomes which engage the 'personal epistemologies' of learners. This is the intrinsic element of designing for enhanced online learner participation. Secondly, recognising that some online learners will initially participate online only if there is formal requirement to do so, there needs to be a formal requirement for online participation using extrinsic motivators such as grading incentives. Specifically the findings add to the body of knowledge that support the notion that active engagement in web forum based learning is highly dependent on a learner's personal epistemology (Hannafin et al., 1997; Laurillard, 1993). The fact that personal epistemologies can be encouraged to develop over the duration of a student's tertiary education (Perry, 1968), reinforces the critical role of instructional design in encouraging more active learner participation online.

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