

Encouraging on-line participation?



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How do you encourage or facilitate on-line participation? What constitutes effective participation? The paper firstly examines selected theories about encouraging effective on-line participation and secondly, reviews a range of qualitative and quantitative methods for assessing the effectiveness of students' on-line participation. The author aims to make informed recommendations on strategies to encourage on-line participation and relevant criteria for assessing participation in on-line discussions, based on an extensive literature review. Within the scope of this paper, on-line participation will be analysed in the context of discussions within internet-based learning environments only.

Introduction

There are many commercially available internet-based learning software packages that include on-line discussion tools (*Comparison of online course delivery software products*, 1999). However, does access to these tools and knowing that their participation will be assessed, encourage students' on-line participation? For Klemm and Snell (1996) "commonly, many students "lurk" in the background...such discussions are not very rigorous and...the quality of instruction suffers". Where discussion is considered a necessary learning method within a course of study, the challenge to the educator is to facilitate effective student participation (Davis, 1999). This concept of discursive learning is an aspect of Bandura's (1971) social learning theory - where understanding and learning is acquired through modelling, the process of observing and formulating an understanding, as a guide to one's own behaviour. Participation within on-line discussions is defined in this paper as the process where learners and educators are actively engaged in on-line text-based communication with each other. Effective participation occurs where this communication facilitates the development of a deep understanding of the material through sharing and critically evaluating ideas, and where connections are made within the material or with independently sourced material. Within the scope of this paper, on-line participation will be analysed in the context of text-based discussions within internet-based learning environments only.

I will firstly examine selected theories relating to on-line participation and secondly, conduct a review of selected methods for assessing the effectiveness of students' on-line participation. There are four specific questions I seek to answer - Of the material reviewed, what are the stated pedagogical concerns and theories applied in the author/s' proposals? Are there any assessment procedures recommended or tested, other than content analysis? Are there any aids to facilitate participation recommended or tested, other than the provision of evaluation criteria? And what are some of the strengths and weaknesses of evaluation criteria as a guide to learning behaviour? In conclusion, I present recommendations on strategies to encourage and assess participation in on-line discussions.

Perspectives on participation

Through dialogue, argument, proof, representation and consensus - learning is mediated by the educator, persuading students to understand the material using the accepted concepts of their discipline (Laurillard as cited in Entwistle, 1995). Teaching that incorporates discussion reflects an iterative learning process. For many educators, "courses must feature ongoing and substantive interaction between instructor and students and among students" (Mabrito, 2000). Both theorists and practitioners (eg. Jones et alia, 2000; Klemm and Snell, 1996) frequently articulate ideas from social learning theory and those of Vygotsky, Piaget, Dewey and Pask. Vygotsky (1978) emphasises the fundamental role social interaction plays in the development of cognition - students can learn from each other's scholarship, skills and experiences. Vygotsky's ideas are complementary to social learning and are a key component of "situated learning theory" - where learning is an act of participation within communities of practice (Lave and Wenger, 1991). Piaget (1970) theorised that cognitive structures change through assimilation and accommodation. There are connections too, between Piaget and Bruner (1966), who contends that learning is an active process, where information is transformed, hypotheses formed and understanding constructed by the learner through cognitive structures. This constructivist theory envisions educator and learner engaged in active dialogue, where information is arranged in a spiral manner to continually builds on existing knowledge. The fundamental idea of Pask's "conversation theory" (1975) is that learning occurs through conversations about a subject matter which serve to clarify and formulate understanding.

Ultimately, proponents of on-line discussion believe the process to facilitate good learning outcomes. Incorporating on-line discussions in teaching should not be a decision to be made lightly or simply the result of adding new technology to a course (Hopper and Harmon, 2000; Laurillard, 1993). Complementary to the pedagogical theories discussed earlier, Bunker and Ellis (2001) outline seven reasons for making on-line discussions part of a learning programme. Drawing upon extensive research, Entwistle (1995) cautions against adopting innovative teaching practices without considering how dependent success will be on the context and the individuals concerned. Instead, he emphasises the need to identify issues such as teaching goals, the particular students' prior knowledge and their intellectual stage of development to enable the selection of appropriate teaching methods.

Contextualising effective on-line participation

On-line discussions can be structured with defined topics and procedures or unstructured allowing students to make free expressions of issues and ideas. The structure and facilitation of on-line discussions varies according to the accepted norms of each disciplines (Jones et alia, 2000). Anderson (as cited in Entwistle, 1995) describes excellence in teaching within Social Science as facilitating a "climate in which misunderstanding is accepted as a necessary step along the path towards understanding". Where discussions involve mature and postgraduate students (eg. A discussion about conceptual frameworks or literary interpretations) - the emphasis is on peer interaction and challenging hegemony. However, Jones et alia (2000) point out that such multiple interpretations cannot be accepted in the case of factually incorrect explanations of phenomena in the Physical and Biological Sciences. The operational difference in participation between the previous examples reflects a difference in function of the discussions. In first scenario, discussion acts as the locus of shared knowledge and practice. In the second, discussion acts as a forum within which diverse and conflicting beliefs and values can be articulated and negotiated.

Nevertheless, discursive and collaborative learning tasks closely approximate the processes of teamwork and collaborative professional writing. These tasks occur frequently in the workplace (Gerson, as cited in Mabrito, 2001), in this way, discussions can bring practical relevance to a course of study. Some on-line learning supporters also assert that the medium facilitates increased levels of collaboration and participation because communication is more student-centred and egalitarian than a face-to-face situation (Brown, 1997; Mabrito, 2000). However, this suggests the medium itself is of paramount importance, and ignores critical features such as the aim of discussions in a particular teaching context and how the discussion is structured (Entwistle, 1995). There are three attributes that typify effective participation, derived from my earlier definition - a deep understanding of the material, critical evaluation of ideas and meta-cognition. The following section will discuss how these can be identified within on-line discussions. Identifying these attributes, in turn, will be proposed as one of the procedures for assessing on-line participation.

Henri and Bloom - identifying effective participation

Of the fifteen cases reviewed on analysing participation in on-line discussions, eight of them utilise Bloom's (1956) *Taxonomy of educational objectives* to interpret discourse (eg. Maznevski, 1996; Peat, 2000). The assumption is that the effectiveness of participation can be determined by reading the messages posted, and categorising them according to Bloom's taxonomy. The taxonomy identifies six educational objectives, listed in order of cognitive complexity - knowledge, comprehension, application, analysis, synthesis and evaluation (Worthen et alia, as cited in Gearhard, 1999). Knowledge is evidenced through basic recall tasks or recognition of facts, procedures or rules. Comprehension is demonstrated through the interpretation or reformulation of the information taught. Application requires information to be used in a different context to that where it was learnt. Analysis is demonstrated through the learners' discrimination of information and ability to compare and differentiate. Synthesis requires the combination of information to find solutions to unfamiliar problems, or in the production of an original work. Evaluation is evidenced through the learner's ability to formulate value judgements about theories and methods for a given purpose.

Levenburg and Major's (2000) research suggests a direct and positive relationship between the amount of time students spend reading postings and engaged in virtual dialogue with their classmates and their achievement of course objectives. They maintain there are more opportunities on-line, to engage in discussions that utilise the higher level cognitive skills than face-to-face. This view assumes that learners will read and interpret postings, as well as formulate and articulate their own opinions. However, high levels of participation without focus or coherence creates confusion and information overload for other learners (Harasim, as cited in Muirhead, 2000). Furthermore "participation inequality" (Nielsen, 1997) - irregular participation or a lack of reflection on prior discussions - can diminish the intellectual rigour of the discussions as well as the learning experience for students, and thus the potential for positive learning outcomes (Jones et alia, 2000).

Eleven of the case studies on analysing participation in on-line discussions use content analysis of the text exchanges within on-line discussions to determine the learning outcomes associated with the level of discourse. Two of these utilised the content analysis model proposed by Henri (McKenzie and Murphy, 2000; McLoughlin and Luca, 1999). This model is based on the educational quality of messages and focuses on the level of participation and interaction within the discussion group. Transcripts are analysed according to four educational dimensions - interactive, social, cognitive and meta-cognitive - as well as the frequency, structure and type of on-line participation. The content analysis referred to in Jones et alia

(2000), Lindeman (2001), Nelson (1998), Northcote and Kendle (2000) and Owen (2000), have similarities to both Henri's and Bloom's models.

All of the content analyses involve reading and classifying comments from transcripts of the discussions. Although this can provide useful data for exploring the way in which participants are contributing to an on-line discussion, there can be problems in implementing content analysis models. McLoughlin and Luca (1999) found Henri's content analysis model applicable to a teacher-centred discussion model but unsuitable to a constructivist student-centred discussion model. McKenzie and Murphy (2000) suggested that Henri's model could be more easily applied to structured, problem solving on-line tasks than a less-structured on-line discussion. Any form of content analysis is by its nature, subjective - some interpretations may not be easily justified or validated when challenged. For instance, McKenzie and Murphy (2000) identified difficulties amongst assessors in consistently distinguishing between levels of critical thinking and meta-cognitive aspects as defined by Henri because of the vague description of their attributes - this greatly limits the validity of the conclusions that can be drawn.

Tracking students' usage of on-line discussion boards is a feature of many courseware packages (Hazari and Smith, 1998; Landon, 2000), quantitative data such as the frequency and time of participation and the use of the on-line discussion tool can be obtained. This alone offers no insight into the learning outcomes for the student or the contribution made to the overall quality of discussion (McKenzie and Murphy, 2000). However, when used alongside content analysis, a detailed and reasonably accurate interpretation of a student's participation in on-line discussions can be formed.

Facilitating on-line participation

Providing scaffolding or structure to on-line discussions is a technique used by numerous educators to facilitate participation (Barnett; Owen, 2000). Highly structured frameworks can encourage and guide students in their discussions. Morgan (2000) cautions against over-structuring to the point of limiting communication "to a wooden exercise or a set of serial monologues". To address this issue, he proposes a "social argument" framework. This reflects an experiential and situated learning approach, where "arguments...are subject-designed experiments [to] try out hypotheses and evaluate results...Their inquisitorial nature...often means that more total information about a person's cognitive processes is publicly available than is usually the case" (Willard, as cited in Morgan, 2000).

To address the issue of a lack of autonomy in teacher-centred facilitation, Paloff and Pratt as cited in Dereshiwsky (2001), suggest obtaining students' input when establishing on-line guidelines. Harasim, as cited in Muirhead (2000) correlates a lack of structure in the on-line discussion to the issue of students not reflecting on prior postings or clarifying their ideas before contributing. Clearly explaining the expected level of participation, acceptable mode of communication and providing constructive feedback are some of the strategies to facilitate on-line participation (Bunker and Ellis, 2001; Davis, 1999; *General conferencing strategies*, 2000). Other approaches to facilitating on-line participation include the use of logic structures or concept maps, as a stimulus for discussion and the use of social or group contracts (Severn, 1998). Klemm and Snell (1996) propose that concept maps can be utilised to visually represent the structure of the learning tasks, which helps students to define their educational goals more clearly, as well as stimulating group discussions. Group contracts enable students and educators to collaborate in developing a formal, written agreement about learning objectives, assessment procedures and measures, and methods of conflict resolution, should

they be necessary. In their study, Murphy et alia (2000) found that group contracts were successful in providing a focus for student groups, enabling successful completion of learning tasks, as well as a means for resolving conflict within groups.

Assessment procedures for on-line participation

Levenburg and Major (2000) identify two reasons for assessing participation - to recognise students' workload and time commitment associated with on-line discussions and to encourage students to participate and in doing so to complete the required learning activities associated with the discussion. Maznevski (1996), a proponent of content analysis, regards it as a useful assessment instrument. The behavioural indicators outlined in Bloom's taxonomy can be evaluated much more objectively than personality traits, such as enthusiasm. Furthermore, on-line discussion participation can be assessed at frequent intervals, unlike final output which can only be assessed summatively (Maznevski, 1996). Schwartz and White, as cited in Dereshiwsky (2001) also recommend that assessment focus on specific behaviours rather than individual personalities; be oriented towards the informational needs of students and directed towards changeable behaviour.

Nelson (1998), Maznevski (1996) and Lindeman (2001) use the behaviour indicators for their content analyses as the evaluation criteria for students as a guide to their learning. Of the material on assessment of on-line participation surveyed, all fourteen articles recommended the use of evaluation criteria. Evaluation criteria can act as a clear guide to expected learning outcomes, quality of thinking and work submitted; and as a positive influence on teaching and learning behaviours, aligning educators and learners towards similar goals (*Assessment of student performance, 1997; Recommendations from the University of Queensland's report of the task force on assessment policies and practices, 1996*). Dennen's (2000) research indicated that increased task structuring, including the provision of evaluation criteria, provided students with extrinsic motivation and task and deadline clarity. This had a positive effect on their performance and learning outcomes. However, the central problem with evaluation criteria is the need for academics begin with a shared interpretation and definitions of criteria across tutorial groups, only then can they encourage their students to be aware of, and use the criteria to direct their learning (Barrie et alia, 1999).

Some educators also award grades to on-line participation (eg. Mabrito, 2000). Using evaluation criteria, grades are awarded in reference to predetermined standards, rather than in comparison to the performance of other students (Gearhard; Jones et alia, 2001; Morgan, 2000; Nelson, 1998). Barnett and Maznevski (1996) suggest the use of an interim participation feedback, to provide students with an indication of their current standing and options to improve the effectiveness of their participation, based on clearly defined evaluation criteria. These options include prompts to increase the intellectual depth of comments through critical analysis and to reflect on and respond to comments made by peers.

Does assessment hamper participation?

Both Davis (1999) and Lacoss and Chylack (1998) state that assessing participation by awarding grades for participation is counterproductive to facilitating good learning outcomes through discussions. Lacoss and Chylack (1998) found that students did not perceive "forced participation rules" to be of value, because some students were "just talking for credit". Students were more motivated to participate when they perceived free conversation was encouraged, as opposed to passive answers to educator-directed questions. Davis (1999) too, raises the concern that assigning grades to participation may discourage free and open

discussion. Moreover, as an instrument of assessment, participation grades disadvantage introverted or shy students (Davis, 1999). While these assertions appear plausible, neither presented compelling evidence to support their claims - the former reporting the opinion of faculty members without supporting data; the latter's sample group consisting of just 9 students, furthermore it is unclear how the sample was selected. More rigorous research into the effects on participation levels of grading could help identify factors affecting students' motivation to participate in on-line discussions.

The decision as to whether on-line discussions should be formally assessed and contribute to the overall assessment of the unit will depend on the aims associated with the discussion (Gosper). To illustrate, Stecher et alia (1997) state that those who choose to participate, are often more engaged in the learning experience than those whose participation is compelled. Voluntary participation indicates commitment and a high motivation to do well. On the other hand, compulsory assessed participation can provide useful results for comparison across the course. This can be used as a performance indicator for the educator, and as an accountability measure for the course (Stecher et alia, 1997). On the other hand, Hallett and Cummings (as cited in Muirhead, 2000) found that students did participate in on-line discussions beyond the required assignments because the work was not assessed.

Conclusion

Success in on-line teaching and learning depends on many variables - I believe the critical issue is co-operation. As discussed earlier, extreme individualism and a refusal to perform within accepted norms (eg. regular participation or reading messages) can de-rail on-line discussions. Not surprisingly then, educators frequently articulate socially-oriented pedagogical ideas. Of the forty-four articles analysed, all the authors operate from a point of view that embraces collaboration and interaction as facilitating good learning outcomes. This point of view is sometimes linked to formal pedagogical theory (Laurillard, 1993) or inherent in their descriptions of teaching on-line (Nelson, 1998). An issue not clearly addressed in many of the case studies reviewed was whether the students undertaking those on-line courses, place similar value in collaboration and interaction. More research involving pre and post testing of attitudes towards collaboration and interaction of both educators and students in on-line discussion groups would provide useful information about the relevance of discussion from the student's perspective.

In all the cases reviewed, the authors subscribe to the idea that on-line discussions require structure to assist students in maximising the learning outcomes. The level of structuring however is dependent on the discipline. McKenzie and Murphy (2000) found that the Graduate students in their case study required minimal structure and participated effectively without assessed or graded participation. However, Harasim (as cited in Muirhead, 2000) found that a lack of formalised structure led to poor participation and confusion amongst students. Hallett and Cummings (as cited in Muirhead, 2000) found that participation occurred only when it was graded. The question of whether on-line participation should be assessed to stimulate participation is yet to be answered with certainty. I concur with Entwistle (1995) that comprehensive planning, prior to providing access to on-line courses is crucial to ensure pedagogical and technical goals can be met. Further research into the use of group learning contracts (eg. Severn, 1998) and concept maps as alternate structures to guide students would allow for more accurate comparisons between these scaffolding techniques.

Apart from usage statistics and content analysis, I have not found other assessment procedures proposed within the cases reviewed. The process of content analysis, typified by

Mckenzie and Murphy (2000), appears to be time consuming and complex. Their study involved thirty-eight participants and I contend that the intricacy of reading transcripts thoroughly and classifying comments would be unfeasible for larger class numbers. Peer-assessed content analysis would simply shift the burden of work to students, although Zariski (1996) suggests that peer-assessment using pre-determined criteria is a useful to in immersing students in "the standards by which relevant and valuable contributions to disciplinary knowledge are identified". I propose that a personal reflection task can perform a similar function to content analysis. A written personal reflection could be required to address the aims of the on-line discussion and evaluate the strengths and weaknesses of the student's participation. Assessing this piece of writing would be less burdensome for educators than content analysis and has the added benefit of promoting a student's deeper learning through synthesis and reflection.

References

- Assessment of student performance. (1997). [Online]. Available: <http://ed.gov/pubs/SER/ASP/studex.html> [2001, July 07].
- Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.
- Barrie, S. et al. (1999). *Qualitatively different conceptions of criteria used to assess student learning*. [Online]. Available: <http://www.aare.edu.au/99pap/bre99209.htm> [2001, July 07].
- Barnett, M. A. (Date unavailable). Encouraging students' participation in discussions. [Online]. Available: <http://minerva.acc.Virginia.EDU:80/~trc/Encourage.html> [2001, July 07].
- Bloom, B. (1956). *Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain*. New York: Longman
- Brown, A. (1997). Designing for learning: What are the essential features of an effective online course? *Australian Journal of Educational Technology* [Online], 13 (2), 115-126. <http://www.ascilite.org.au/ajet/ajet13/brown.html>
- Bruner, J. (1966). *Toward a theory of instruction*. Cambridge, Massachusetts: Harvard University Press.
- Bunker, A. and Ellis, R. (2001). Using bulletin boards for learning: What do staff and students need to know in order to use boards effectively? In A. Herrmann and M. M. Kulski (Eds), *Expanding Horizons in Teaching and Learning*. Proceedings of the 10th Annual Teaching Learning Forum, 7-9 February 2001. Perth: Curtin University of Technology. <http://ctl.curtin.edu.au/events/conferences/tlf/tlf2001/bunker.html>
- Comparison of online course delivery software products. (1999). [Online]. Available: <http://www.marshall.edu/it/cit/webct/compare/index.htm> [2001, September 24].
- Davies, J. (1999). Early history of research on group processes. [Online], Available: <http://www.ualberta.ca/~jedavies/edse502/theory-history.htm> [2001, September 24].
- Davis, B. G. (1999). Encouraging student participation in discussion. [Online]. Available: <http://www.uga.berkeley.edu/sled/bgd/participation.html> [2001, August 21].
- Dennen, V. P. (2000). Task structuring for on-line problem based learning: a case study. *Educational Technology & Society* [Online], 3 (3). Available: http://ifets.ieee.org/periodical/vol_3_2000/d08.html [2001, June 16].
- Dereshiwsky, M. I. (2001). 'A' is for assessment: Identifying on-line assessment practices and perceptions. *Education at a Distance* [Online], 15 (1). Available: http://www.usdla.org/ED_magazine/illuminactive/JAN01_Issue/article02.html [2001, July 07].
- Entwistle, N. (1995). *The use of research on student learning in quality assessment*. [Online]. Available: <http://www.lgu.ac.uk/deliberations/ocsd-pubs/islass-entwistle.html> [2001, August 21].
- Evaluating and grading*. [Online]. Available: <http://www.gmu.edu/departments/wac/grade.htm> [2001, August 21].

- Gearhard, (1999). *Assessment in online course: a case study*. [Online]. Available: http://homepages.dsu.edu/gearhard/course_assessment.htm [2001, July 07].
- General conferencing strategies*. (2000). [Online]. Available: <http://illinois.online.uillinois.edu/IONresources/confstrategies/genconfstrat.html> [2001, September 24].
- Gosper, M. *Assessment of online participation: Summary of the issues raised by the CFLTOM group*. [Online]. Available: <http://online.mq.edu.au/pub/CFLTOM/assess.html> [2001, October 04].
- Hazari, S. and Smith, R. (1998). *Evaluation and selection of web course management tools*. [Online]. Available: <http://sunil.umd.edu/webct/> [2001, September 24].
- Hopper, K. and Harmon, S. (2000). A multiple-case study of exemplary Internet courses. *Education at a Distance* [Online]. Available: http://www.usdla.org/ED_magazine/illuminactive/SEP00_Issue/PDF/EdMagazine_SEP00.pdf [2001, April 20].
- Jones, A. et al. (2000). Conferencing in communities of learners: examples from social history and science communication. *Educational Technology & Society* [Online], 3 (3). Available: http://ifets.ieee.org/periodical/vol_3_2000/c02.html [2001, June 16].
- Kearsley, G. (2001). *Explorations in learning and instruction: The theory into practice database*. [Online] Available: <http://tip.psychology.org/index.html> [2001, August 21].
- Klemm, W.R. and Snell, J.R. (1996). Enriching computer-mediated group learning by coupling constructivism with collaborative learning. *Journal of Instructional Science and Technology* [Online], 1 (2). Available: <http://www.usq.edu.au/electpub/e-jist/vol1no2/article1.htm> [2001, August 21].
- Lacoss, J. and Chylack, J. (1998). What makes a discussion section productive? [Online]. Available: <http://minerva.acc.Virginia.EDU:80/~trc/discprod.htm> [2001, July 07].
- Landon, B. (2000). *Online educational delivery applications: a web tool for comparative analysis*. [Online]. Available: <http://www.c2t2.ca/landonline/compare2.html> [2001, September 24].
- Laurillard, D. (1993). *Rethinking university teaching*. London: Routledge.
- Lave, J. and Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Levenburg, N. and Major, H. (2000). Motivating the online learner: The effect of frequency of online postings and time spent online on achievement of learning goals and objectives. [Online]. Available: <http://as1.ipfw.edu/2000tohe/papers/Levenburg/levenburg.htm> [2001, September 16].
- Lindeman, M. (2001). *Student assessment in online courses: discussion rubric*. [Online]. Available: <http://illinois.online.uillinois.edu/online/assessment/discussionRubric.html> [2001, September 24].
- Mabrito, M. (2000). *Facilitating and evaluating student interaction in an online business writing course*. [Online]. Available: <http://as1.ipfw.edu/2000tohe/papers/mabrito.htm> [2001, September 24].
- Maznevski, M. (1996). *Grading class participation*. [Online]. Available: <http://www.virginia.edu/~trc/tcgpart.htm> [2001, July 07].
- McLoughlin, C. and Luca, J. (1999). Lonely outpourings or reasoned dialogue? An analysis of text-based conferencing as a tool to support learning. [Online]. Available: <http://www.ascilite.org.au/conferences/brisbane99/papers/mcloughlinluca.pdf> [2001, August 02].
- McKenzie, W. and Murphy, D. (2000). "I hope this goes somewhere": Evaluation of an online discussion group. *Australian Journal of Educational Technology*, 16(3), 239-257. <http://www.ascilite.org.au/ajet/ajet16/mckenzie.html>

- Morgan, M. (2000). *Guiding online discussions: A social argument framework*. [Online]. Available: <http://asl1.ipfw.edu/2000tohe/papers/morgan.htm> [2001, April 10].
- Muirhead, B. (2000). *Enhancing social interaction in computer-mediated distance education*. [Online]. Available: http://grouper.ieee.org/groups/lts/ifets/discussions/discuss_sept2000.html [2001, May 05].
- Murphy, K. et al. (2000). Role of contracts in enhancing community building in web courses. *Educational Technology and Society* [Online], 3(3). Available: http://ifets.ieee.org/periodical/vol_3_2000/e03.html [2001, July 07].
- Nelson, G. (1998). *On-line evaluation: Multiple choice, discussion questions, essay and authentic projects*. [Online]. Available: <http://leahi.kcc.hawaii.edu/org/tcon98/paper/nelson.html> [2001, May 16].
- Nielsen, J. (1997). Community is dead; long live mega-collaboration. [Online]. Available: <http://www.useit.com/alertbox/9708b.html> [2001, April 07].
- Northcote, M. and Kendle, A. (2001). Communication skills for online students: An evaluation of a website. In A. Herrmann and M. M. Kulski (Eds), *Expanding Horizons in Teaching and Learning*. Proceedings of the 10th Annual Teaching Learning Forum, 7-9 February 2001. Perth: Curtin University of Technology. <http://ctl.curtin.edu.au/events/conferences/tlf/tlf2001/northcote1.html>
- Owen, M. (2000). Structure and discourse in a telematic learning environment. *Educational Technology & Society* [Online], 3 (3). Available: http://ifets.ieee.org/periodical/vol_3_2000/b04.html [2001, April 20].
- Pask, G. (1975). *Conversation, cognition, and learning*. New York: Elsevier.
- Peat, M. (2000). Online assessment: The use of web based self assessment materials to support self directed learning. In A. Herrmann and M.M. Kulski (Eds), *Flexible Futures in Tertiary Teaching*. Proceedings of the 9th Annual Teaching Learning Forum, 2-4 February 2000. Perth: Curtin University of Technology. <http://ctl.curtin.edu.au/events/conferences/tlf/tlf2000/peat.html>
- Piaget, J. (1970). *The science of education and the psychology of the child*. New York: Grossman.
- Sklar, E. and Pollack, J. (2000). A framework for enabling an Internet learning community. *Educational Technology & Society* [Online], 3 (3). Available: http://ifets.ieee.org/periodical/vol_3_2000/e02.html [2001, June 16].
- Recommendations from the University of Queensland's report of the task force on assessment policies and practices (1996). [Online]. Available: <http://www.tedi.uq.edu.au/Assess/Assessment/asprochr.html> [2001, July 07].
- Severn, K. (1998). *Group learning contracts*. [Online]. Available: <http://disted.tamu.edu:8000/classes/glcontracts.html> [2001, July 07].
- Stecher, B. et al. (1997). Using alternative assessments in vocational education. [Online]. Available: <http://nccte.com/publications/nerve/mds-09xx/mds-946.html> [2001, July 07].
- Vygotsky, L. (1978). *Mind in society*. Cambridge, Massachusetts: Harvard University Press.
- Zariski, A. (1996). *Student peer assessment in tertiary education: Promise, perils and practice*. [Online]. Available: <http://carmen.murdoch.edu.au/%7Ezariski/peer1.html> [2001, July 16].

