The Student Voice: Perceptions of autonomy and collaboration in learning with technology.

C. McLoughlin
Edith Cowan University

Introduction

The potential of communications technologies to deliver interactive and efficient instruction to remote sites is well documented in the literature (e.g., Jonassen & Reeves, 1996; Mason, 1994). Nevertheless, several studies also signal the limitations of audiographic conferencing technology and of the pedagogies that it may lead to. Among these are controlling and didactic aspects of teaching strategies (Thompson, 1996) and limited use of the technology to support cognitive interaction between students (Oliver & McLoughlin, 1997). Other studies have shown that computer-supported learning environments combined with the application of appropriate pedagogies can ensure quality learning with affective and cognitive outcomes (Repman, 1993). Recent empirical studies show that a great deal of emphasis is placed on current uses of technology to support student autonomy and to create an empowering environment (Alonso & Norman, 1996; Saye, 1997).

The view explored in this paper is that in order to evaluate the success or otherwise of a learning environment, it is important to find out how students perceive the technology, whether they are comfortable with it and whether they regard it as improving or changing the learning experience. Those engaged in educational evaluation might well ask: What difference does computer technology make to the quality of everyday classrooms? Research eliciting student views is sparse, though the question has been asked of teachers (Wild, 1996). The purpose of the research reported here was to explore student perspectives on audiographic conferencing, to allow students to say what worked for them, and to encourage them to share their views of how technology affected their learning. Student attitudes may be good indicators of how technology is perceived, and by sharing their experiences and insights, students enable educators to evaluate technology implementation and its putative transformative effects.

Technology and the potential for student autonomy and empowerment

The debate about how best to integrate computers into the curriculum-based culture of schooling and to foster student autonomy is a recurring theme in the literature. A number of theorists have commented that computers are used in a way that is ‘decoupled from the mainstream of classroom life’ (Crook, 1994, p. 29). This means that computers are often seen as by teachers as devices for saving time, increasing the efficiency of teaching and learning and instruments for maintaining order and structure (Fraser et al, 1991; Underwood, 1990). One of the major themes that has emerged from recent investigations of technology supported classrooms is the potential of
technology to support student-centred learning (Light, 1993; Mercer, 1996). Technology can also be conceived of as providing apprenticeship models of learning, and of enabling students to become increasingly more self-regulated (Jarvela, 1996).

In discussing aspects of effective environments for learning, a number of researchers have commented on the need to create the conditions necessary for independent learning. For example, much of the recent literature has referred to the need for ‘learner control’ in the design and planning of multimedia for learning (Oliver & Reeves, 1996; Kinzie, 1990). Authorship and generativity are further dimensions of learning environments which relate to the amount of choice, control and self-direction given to students (Hannafin & Sullivan, 1995). The degree to which learners can design, create and explore learning materials is an important element in fostering higher levels of thinking. Therefore, environments where learners can share responsibility, show initiative and make decisions are conducive to independent learning (Grabowski, 1996). Jonassen & Reeves (1996, p. 695) talk about the impact of student involvement in computer assisted learning ‘...empowering learners to design and produce their own learning experiences is a powerful learning experience’. The dimensions of learner control, generativity, authorship and communicative interaction are all widely accepted features of learning environments that are supportive of learning. Examples of design principles that enable students to develop independent thinking are those that:

- have instructional formats that allow learners to have choices within a structured learning experience (e.g., Anderson & Garrison, 1995)
- offer activities that support both collaboration and communicative independence (Teasley, 1995);
- provide activities that enable students to represent their own meanings (Greeno, 1997).

In face-to-face classrooms where a teacher is present there has been a great deal of research into the use of computers to support group work and collaborative dialogue (Jonassen, Davidson, Collins & Campbell, 1995; Anderson, Tolmie & McAteer, 1993). In contrast, distance learning settings which support synchronous communication have received much less research attention, and the computer is often regarded simply as a hardware to enable geographically separated students to interact and share texts and resources (Wagner, 1994). By presenting student perspectives on learning via telecommunications we can establish whether technological link-ups and interaction between distant sites create forms of student autonomy that change the teaching-learning equation.

What do students think? Issues of control and empowerment

Studies in technology supported classrooms suggest that student perceptions of the instructor and of the instruction are closely tied to positive or negative evaluations of distance learning settings. Recent studies have investigated several different dimensions of learning mediated by technology. One study, by Jayasinghe, Morrison & Ross (1997) investigated reactions to teachers’ immediacy behaviours and found that teachers who established eye contact were more likely to be regarded as warm, persuasive and credible by students. Similarly, Walker & Hackman (1992) found that learner satisfaction in a telelearning environment was higher when students perceived the learning as interactive. The important implication of these studies is that academic achievement and satisfaction with a course are likely to be greater if students have positive perceptions of the instructor. However, these studies are limited as they do not investigate student perceptions of their own behaviour, their own learning or of the whether the culture of the classrooms changes when technology mediates learning.

If we know little about how students think about their own learning, we cannot presume that structural manipulations and technological innovation are sufficient to create independent learning environments for learners. Often, the success or otherwise of technology is interpreted through attrition rates, achievement scores or measures of academic performance. More direct investigations of student opinions seem to be missing from the literature. Despite the paucity of investigations of student views, constructivist theory highlights the central role of student engagement in learning (Harper & Hedberg, 1997). In other studies, the salient factor to emerge in evaluating the learning environment is the association between pupils’ sense of personal control over their learning and their level of academic achievement (Hannafin, 1995).

In addition, research into effective means of fostering personal control has emphasised learners’ capacities for ‘self-instruction’ (Peterson & Swing, 1992; Wang & Peverley, 1987). For self-instruction to be effective, learners need to feel comfortable and confident with the learning environment and subject matter, and be able to integrate this with planning learning strategies and self-monitoring skills. Such findings signal the importance of investigating students’ perceptions of control, comfort and confidence with technology.

Another research focus has been to address the question of how teachers can influence levels of learner activity through classroom strategies which create opportunities for students to take control of their own learning (Kinzie, 1990; Scardamalia & Bereiter, 1993; McLoughlin, & Oliver, 1995). The need to make learning environments more learner centred is expressed by one writer as follows:

The issue on education is control. Who is in control? Now it is curriculum designers, lecturers and workbook publishers. In many cases it ought to be students. The real role of the teacher, computer or human is to keep the environment interesting enough to prompt questions. (Schank & Jona, 1991, p. 32).

Educational technologists need to investigate learner perceptions of their environment and ask students whether they regard technology as empowering or disempowering, so that planning for improved learning can proceed on the basis of feedback and first hand...
experience. Existing studies on this aspect of learning with technology have not proved consistent or wide ranging. For instance, in technology saturated environments where IT is used extensively and promoted, supported and financed as in the ACOT program, there are widespread high levels of satisfaction (Fisher, Dwyer & Yocam, 1996). In other, more general populations there is less evidence that technology is used to change teaching practice or empower students.

**Audiographics classrooms**

Across Australia, a considerable number of schools use audiographic technology to teach classes in rural and isolated areas. According to the Victorian Ministry of Education and Training Report (Conboy, 1991), the term telematics is described as: electronically based equipment and the processes and strategies used to enable interactive teaching and learning between two or more geographically remote locations. In Western Australia the term 'telematics' is used to describe the particular use of audiographic technology to teach students at a distance.

The study reported here comprised five linked remote classrooms which received instruction in five different subject areas, Maths, Science, Italian, English and Social Studies, from teachers who used audiographic conferencing to teach at a distance. The research was conducted with fifteen students participating in the Academic Talent Program delivered via audiographic conferencing. Five schools participated in the program, which was delivered from a school in the Perth metropolitan area by specialist subject teachers. Two of the sites had four students, one had two students the other had five students. All students were aged 13 years and all were studying in the first year of secondary school and participating in the Academic Talent Program offered by the Education Department of Western Australia.

**Data collection and analysis procedures**

As the curriculum objective of the Academic Talent Program was to develop higher order thinking skills and autonomous learning, it was considered important to ask students how technology affected their learning, and whether it fostered forms of autonomous activity. The research questions therefore focused on individual and group experiences of learning via audiographic conferencing. The following open-ended questions were asked of students at each site:

1. How is learning via audiographic conferencing different from learning in the face-to-face classroom?
2. How does the technology affect talk and communication in your classroom?
3. What problems (if any) did you experience with the technology?
4. Does learning via audiographic conferencing change you as a learner (ie your learning style and way of communicating).

At the end of each term in the one year program, students were interviewed and asked whether they found the technology constraining or liberating and whether it changed their learning patterns. In addition to student interviews, classrooms were observed and videotaped so that their views could be compared with the actual teaching and learning events that were recorded. Each group of students was asked to respond to the questions and the responses are reported in Tables 1, 2 and 3. Open ended questions were used in order to enable students to elaborate on issues considered important.

**Summary and interpretation of main findings**

**Technological change**

Table 1 presents a summary of responses to the question: How is learning via audiographic technology different from learning in a face-to-face classroom? Students were shown to be adaptable to pedagogical change and to be very positive about it. They were also quite resilient to problems that occurred and took the view that they had to learn the skills required when technological difficulties occurred. This expressed tolerance with the technology was attributed to their perception that knowing about technology was a skill in itself, one that was highly relevant to their learning in other subject areas. Clearly, the distance education setting presented challenges to these students, but they were well prepared to meet them. Students were comfortable with the technology and open to the changes it brought in terms of group interaction, communication patterns and learner control.

<table>
<thead>
<tr>
<th>Location</th>
<th>Responses</th>
<th>Salient feature of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 n = 4</td>
<td>more exciting; more independent; teaches us about technology; more freedom; we can talk to each other when we want</td>
<td>independence; freedom to communicate</td>
</tr>
<tr>
<td>Site 2 n = 4</td>
<td>more independence; teacher has less control; can say what we like; we can draw things on the computer screen; we have to be really prepared</td>
<td>less teacher control</td>
</tr>
<tr>
<td>Site 3 n = 2</td>
<td>it helps us know a lot about computers; we have more freedom; we have to organise ourselves better</td>
<td>need for organisational skills</td>
</tr>
<tr>
<td>Site 4 n = 5</td>
<td>I think we are special; we have to troubleshoot; lots more work to do; the teacher expects us to be ready;</td>
<td>trouble shooting skills; readiness for class</td>
</tr>
</tbody>
</table>
Interaction and communication

Students perceived the technology to have a liberating effect on their learning and interaction. Table 2 summarises responses to research question 2: How does the technology affect talk and interaction in your classroom? As the teacher was 'invisible', students were less constrained in questioning each other and seeking clarification. They also believed that they could interact with peers in other remote classrooms through the two-way audio channel. In accounting for this perception of increased freedom and autonomy, much can be attributed to the teachers’ implementation of strategies to enhance use of technology as a communicative exploratory tool. Overall, students felt a strong sense of autonomy in the electronic classroom, a willingness to prepare for class and organise themselves. Students quickly mastered the etiquette of communicating across distance and the technology seemed to have exercised a strong motivating influence in the classrooms observed. Only one student was concerned that she felt that the technology was a little impersonal, and that it was difficult to make a spontaneous remark or response.

Perceived problems with technology

Despite technical problems, students surveyed seemed to be very positive about the technology and were comfortable using it. In response to research question 3, What problems (if any) did you experience with the technology?, many saw the technology as a bonus: learning in a new way through use of audio-conferencing, and in addition becoming more competent with technology was regarded favourably. Student reactions included: I think it's exciting that the school is doing this. After all, that's how people learn nowadays. Other students referred to the experience of learning at a distance as doing telematics, a comment which signalled that they considered the technology as important, perhaps as important as the subject matter being studied.

Another interesting finding that emerged was that students at each site were tolerant of the frequent technological breakdowns that occurred, for example when the modem line failed, or the audio quality was poor. They also seemed sympathetic to teachers who were not always in control of these aspects of the classroom. One student commented, I guess the teacher is like us: he's learning too.

Learning through collaboration

Table 2: Summary of responses to questions about interaction in the distance classroom

<table>
<thead>
<tr>
<th>Comment</th>
<th>Interpretation</th>
<th>n (number of responses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interaction is freer than it is in a face-to-face classroom</td>
<td>freedom autonomy</td>
<td>2</td>
</tr>
<tr>
<td>There is more collaboration and friendship among classmates.</td>
<td>collaboration</td>
<td>3</td>
</tr>
<tr>
<td>It is possible to get to know the kids from other remote schools.</td>
<td>rapport</td>
<td>2</td>
</tr>
<tr>
<td>The teacher does not always try to lead the discussion,</td>
<td>student centred</td>
<td>1</td>
</tr>
<tr>
<td>We have plenty of freedom.</td>
<td>new communication protocols</td>
<td>3</td>
</tr>
<tr>
<td>It sometimes gets a bit difficult cos you have to wait to speak, and you can't interrupt. You have to work out a way of signalling to the teacher that you have something to say. Then it's O K</td>
<td>effective listening skills</td>
<td>3</td>
</tr>
<tr>
<td>Sometimes you wonder if anyone hears you .. now we have a way of checking that we are heard and we also give feedback to others. That's a new way of talking. You have to make sure that you understand and that others understand what you are saying.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 provides a summary of responses made by students. Many reported that because the teacher was not present, they formed stronger relationships within their groups and learnt how to cooperate on problem solving and other tasks. As one student commented: It's not telematics itself, its the way we do it - a remark which implied that the technology was not a main factor in this change of orientation to learning. Instead, the pattern of interaction had changed to one where there was less reliance on teacher direction and more cooperative discussion within the group. Students had a clear sense of empowerment through technology, evidence for which can be seen in their similar comments on the empowering features of the technology.
Students were also aware of the different learning styles needed in the electronic classroom and of the increased responsibility for their own learning, as the teacher was not there to monitor and supervise them. Most students acknowledged that this increased freedom helped them to share ideas, support each other and develop better study habits. All students recognised the increased autonomy and saw it as providing greater scope for them to achieve group outcomes and engage in discussion.

The comments in Table 3 can be interpreted as a change of direction for learners, an awareness of the communicative and collaborative experience of learning at a distance. Students clearly valued the change in the experience of learning, but most saw the technology as only a small element in this equation. Most of the empowerment was seen to come from their own camaraderie, from their relationships within the group and from their determination to succeed despite the technological problems that occurred. There were few expressions of communicative apprehension, and this finding indicated that protocols had been established by the teachers to enable participation and communication between groups. Students were comfortable with the shift from more traditional methods of instruction, where the teachers directs and manages, and perceived this as empowering.

**Conclusion**

Previous studies have shown that cultural perceptions of technology and learning persist in the classroom and that students often arrive in class with well developed, often resilient notions of what teaching and learning are and that their views are often reflective of a traditional paradigm of instruction (Sheingold et al, 1990; McHenry & Bozik, 1995). In contrast to these studies, the students in the present study were found to be strongly constructionist in their orientation. They saw learning as organised around sharing and refinement of ideas, collaboration and construction of ideas through group discussion.

---

**Table 3:**

**Perceived differences in the quality of learning in the electronic classroom**

<table>
<thead>
<tr>
<th>Nature of view</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empowerment</td>
<td>- We have more freedom in class/the teacher is less controlling.</td>
</tr>
<tr>
<td></td>
<td>- We have to be more independent cos we don't have the teacher with us.</td>
</tr>
<tr>
<td></td>
<td>- The teacher can't solve problems for us- he's not here exactly, so we have learnt to figure it out or ourselves.</td>
</tr>
<tr>
<td></td>
<td>- I realised that I learn better this way. I mean, you have to figure it out for yourself in the long run.</td>
</tr>
<tr>
<td>Collaboration</td>
<td>- We have to talk more to each other than to the teacher.</td>
</tr>
<tr>
<td></td>
<td>- I know there is help there when we need it. But we try to help each other.</td>
</tr>
<tr>
<td></td>
<td>- One great thing is that we can bounce ideas off each other. W e share ideas and get more ideas.</td>
</tr>
<tr>
<td></td>
<td>- I think we have become really good mates and we do help each other a lot, like we even read each other’s essays- wow!</td>
</tr>
<tr>
<td></td>
<td>- Like when I don’t understand something, I rely first on my classmates instead of asking the teacher.</td>
</tr>
<tr>
<td>Dialogue and conversation</td>
<td>- Really what is different is that we talk a lot and share ideas.</td>
</tr>
<tr>
<td></td>
<td>- Discussion is a big part of the way we learn, and it’s new to us.</td>
</tr>
<tr>
<td></td>
<td>- We are all probably better listeners now.</td>
</tr>
<tr>
<td></td>
<td>- You have got to be able to explain your views and make connections.</td>
</tr>
<tr>
<td>Higher order thinking</td>
<td>- There is a sharing of ideas and we are becoming more questioning of each other.</td>
</tr>
<tr>
<td></td>
<td>- The teacher expects us to criticise ideas and to develop our own work.</td>
</tr>
<tr>
<td></td>
<td>- Learning this way makes more demands - you have to be more independent minded- at the same time, you have to collaborate.</td>
</tr>
<tr>
<td></td>
<td>- We try to balance ideas off each other, try to give each other feedback and be better learners.</td>
</tr>
</tbody>
</table>
In this case study, students reported a strong sense of a classroom community which extended beyond each isolated classroom and incorporated the distributed network of classrooms involved in the Academic Talent Program for rural and remote schools in Western Australia. This could have been reflective of teachers’ effective use of the technology to shift responsibility from the teacher to the students. An investigation of teacher pedagogy and belief systems could identify whether there was congruence between the perception of autonomy by students and teachers’ beliefs about developing autonomy and independence in telematics classrooms. It may also be an indication that the teachers in the study modelled effective independent learning for students and used technology to support collaboration of both of these issues could be pursued in a further study.

The findings contribute to existing evaluations of audiographic conferencing environments and suggest that empowering learning can be achieved by the instructional intention to move beyond the technical link, to develop systems to support students to act independently, to listen, to communicate, and to share ideas. In this sense, the case study presented here can be seen in the context of the larger debate on how technology changes student roles in a distributed classroom. But most important, it shows that by eliciting student concerns and opinions of technology, insights can be gained into the dynamics of learning and interaction in classrooms supported by technology. Listening to the student voice is therefore an important pursuit for teachers and educational technologists.

REFERENCES


