

“Count me in”: Students with chronic illness continue mathematics study through connection with their teachers during absence

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Abstract:

Involvement in their school community provides children and young people with opportunities for participation that benefit them educationally. Their inclusion and sense of belonging can be disrupted by the experience of chronic illness. More than 10% of Australian children and young people are considered to have a chronic health condition. Many of these conditions can be managed without significant interruption to a young person's normal schooling trajectory. For others a chronic illness results in substantial absence from school for prolonged or accumulative periods of time and the likelihood of educational disadvantage, which impacts on their quality of life and employment prospects.

Although on-site hospital schools traditionally provide learning programs for children and young people during hospitalisation, medical advances and decentralised approaches to healthcare have resulted in shorter hospital stays and reduced access to educational support. Recuperating at home, many children and young people are out of reach of hospital schools but are too unwell to attend their own schools, increasing the potential for isolation and disruption to their education.

Previous research has found that students with chronic illness want to continue with their school studies and maintain connection to their schools during absence. The need to consider ways to achieve this arose in the context of a research project called Link 'n Learn. Funded by an Australian Research Council linkage grant, it has investigated the utilisation of increasingly flexible communications technologies to enable children and young people, hospitalised or recuperating at home, to continue with their school studies through connections to their teachers, peers and schools.

This paper focuses on one part of the Link 'n Learn project: a collective case study of 22 participants – Years 10, 11 and 12 students and their mathematics teachers. It discusses issues surrounding the process of establishing and sustaining connections between teachers and their students. A model highlighting different purposes for interaction is presented, and facilitators of and impediments to academic continuity in mathematics are discussed.

Keywords: Secondary schooling; chronic illness; school absence; academic continuity; mathematics; digital technologies

Introduction

Australian statistics indicate that both incidence and survival rates are increasing for some types of chronic illness over the past few decades (Australian Institute of Health and Welfare, 2007, 2009). There are subsequently increasing numbers of surviving Australians who experience chronic illness as children or young people. Many health conditions, although considered chronic, can be managed without significant interference with the normal trajectory of a young person's schooling. Asthma may involve an inhalation regime, diabetes regular insulin injections but for the most part, children and young people are still able to attend school. A chronic illness such as cancer or anorexia nervosa involves intensive treatment and prolonged absence from school is a likely occurrence: a young person may need to be hospitalised and convalesce at home; they may require regular, recurrent

cycles of treatment which cannot be administered at school; or they may need intermittent periods of hospitalisation or recuperation over several months.

For children and young people who are hospitalised, educational support is often provided by on-site hospital schools that offer bedside teaching or lessons in a classroom within the hospital. Decentralised approaches to health care and medical advances mean that young people with chronic illness are less likely to be hospitalised for lengthy periods of time – they may spend a number of days in hospital rather than several weeks and then recuperate at home. Some types of medical treatment may be administered to young people as outpatients or in their homes (Potas & Jones, 2006; RCH Education Institute, 2008). Because young people spend less time in hospital, they have reduced access to the educational support provided by on-site hospital schools. Yet they are still too unwell to attend school. Home visits by tutors or visiting teachers may be funded but eligibility and availability vary across educational sectors (Shaw & McCabe, 2008). In Victoria, a student may receive one hour's tuition per week from the Visiting Teacher service in the state education sector but only if they have been absent from school for an extended period. Those whose absence from school is recurrent or intermittent are likely to receive no interim educational support at all.

For most children and young people a big part of normal life is attending school. Their learning, interaction with teachers and peers, classes and school activities are usual day-to-day experiences within the familiar school environment. School connectedness is defined as students' perceptions of being accepted by their school and identifying themselves as being part of their school (Frydenberg, Care, Freeman & Chan 2009). For students with chronic illness, being absent from school and losing contact with teachers and peers for significant periods of time may create apprehension and fears about disrupted friendships and falling behind academically (Charlton, Pearson, & Morris-Jones, 1986; Sullivan, Fulmer, & Zigmund, 2001). Addressing these students' social and academic needs and interests, minimises the educational disadvantage imposed on them by chronic illness; it also improves future quality of life and employment prospects (Charlton, et al., 1986; Lightfoot, Wright, & Sloper, 1999). Maintaining social and educational connections to school may contribute to young people's sense of normalcy, broadened choices for them, and increased hope. Opportunities to continue their learning and education may provide welcome distraction from the intrusion of medical treatment. Research has found that keeping things as normal as possible for children and young people decreases their anxiety, increases their sense of control and helps them cope better with treatment (Bessell, 2001; Brown & Madan-Swain, 1993; Rynard, Chambers, Klinck, & Gray, 1998; Shute, 1999). Absence from school for a prolonged period of time leading to a decrease in school connectedness may result in students becoming reluctant to return to full-time schooling (Bessell, 2001; Haas & Fosse, 2008; Rynard, et al., 1998).

This paper highlights one part of a research project funded by an Australian Research Council (ARC) Linkage Grant for three years and undertaken by the Royal Children's Hospital (RCH) Education Institute and the Melbourne Graduate School of Education, the University of Melbourne. It explores themes surrounding the potential for academic continuity, defined in this context as 'access to and utilisation of opportunities to learn effectively so that academic progress is made despite disruption to full-time attendance at school'. The focus is on senior secondary students with chronic illness who sought to continue mathematics study and their teachers at school. The following section sets the background for the study by describing previous research that explored technology-mediated interaction between students and their schools during absence.

Previous research

Although hospital schools usually provide educational support for children and young people during extended stays in hospital, concern about those who are in and out of hospital repeatedly, or who spend considerable time recuperating at home, remains. Irregular and unpredictable patterns of hospitalisation and recuperation decrease the likelihood of ongoing educational support from either a hospital school or a student's own school. Surmising that students' own schools might be better

situated to provide educational support during periods of time when students are out of the reach of hospital programs, the Royal Children's Hospital (RCH) Education Institute undertook three pilot projects over the past eight years to investigate the potential for students with chronic illness, whether hospitalised or at home, to maintain academic and social connections to school.

The *CYCLE* (Children and Youth Connected with Learning Technologies to Education) project supported hospitalised children and young people in maintaining contact with their schools of origin (Fels, Shrimpton, & Robertson, 2003). Hospital education advisors liaised with school teachers and passed on to students the required learning materials and tasks from school, with parents being relied upon to courier materials. Email, facsimile, desktop videoconferencing and telephone were used for communication with schools. An initial evaluation of the project found that students liked being able to continue with their own regular schoolwork. With such support, they could maintain a routine, know what was happening in their studies, keep in touch with peers, and maintain an important non-medical aspect of their lives. A lack of equipment and teachers struggling to utilise communications technologies were highlighted as issues. Teachers raised their concern about needing information about the students' health status. It was found that makeshift processes for monitoring a student's progress had to be implemented in schools because there were no specific policies for managing prolonged absence.

The *WellCONNECTED* pilot project began in 2004 for 18 months. It involved the administration of online connections between 20 Years 11 and 12 students with chronic illness and their teachers using a virtual classroom package called 'Manhattan' (Potas, 2005). Whilst capable of much more, Manhattan was found to be used mainly for email exchanges with teachers and other students. The evaluation highlighted teachers' inadequate technology skills as a significant impediment (Cook, 2005). Students, however, spoke positively of their participation: they unanimously recommended online connection to school and reported feeling more motivated with their studies. The teachers reported that they found the training inadequate despite an expensive and intensive professional development program. Teachers also said that their workloads were too high for them to invest in the time needed to master the technological skills required. They also expressed concern about allocating so much time and attention to the support of only one student.

The *Back on Track* project was funded by the Bone Marrow Donor Institute from 2005 for nearly four years until the global financial crisis resulted in withdrawal of sponsorship (the *onTrac@PeterMac* program still continues at the Peter MacCallum Cancer Institute in Melbourne). The project investigated ways of maintaining connections to school for children and young people undergoing cancer treatment. Hospital education advisors: provided support for schools to help them develop modified learning programs; arranged student-support-group meetings; oversaw the provision of laptops and Internet access in hospital and students' homes; and administered access to the online communication system (initially Manhattan then Adobe® Connect™). The teachers highlighted their additional workload pressures, and that their schools did not provide time or resources to help them manage the extra effort involved in supporting their student (Campbell & St Leger, 2006).

The findings of these pilot projects drew attention to several practical and procedural issues, unsurprising given the coordination and infrastructure required for the interaction of so many stakeholders: students, families, teachers, schools, medical and health personnel, and hospitals. Complexities at the intersection of health-related and educational contexts has been highlighted by previous research (for example, Ashton & Bailey, 2004; Bolton, Closs, & Norris, 2000; Eiser, 2000; Fowler, Johnson, & Atkinson, 1985; Lynch, Lewis, & Murphy, 1992). Yet the positive feedback of students with chronic illness, the advent of increasingly flexible and affordable technologies, and concern for students not receiving adequate learning support during absence from school, led to ongoing research efforts which included the ARC-funded project named *Link 'n Learn*, begun in 2008. The following section describes the design of a collective case study to examine the potential for achieving academic continuity for senior mathematics students through connection to school.

Research design

Each student's circumstances and characteristics prove unique – their type of illness, their prognosis, their hospital and home situation, their academic background, their learning style and motivation, their teacher and school, and so on. Each teacher's response to having a student with chronic illness, given particular professional and personal circumstances, is complex – reacting emotionally to the concept of young people with illness, concern for their student, wondering about their professional responsibilities, considering their confidence with technology-mediated communication, examining their beliefs about education, managing their workload, and the like. It was considered important to gain an in-depth understanding of students' experiences of ongoing study during absence from full-time schooling, and the issues they dealt with in interacting with their teachers and seeking academic continuity – 'a contemporary phenomenon within its real-life context' (Yin, 2003, p. 13). It was also important to examine the experiences from teachers' perspectives and the multifaceted issues they confronted. Involving both students and their teachers in the research and seeking their different views – their 'voice' – were considered crucial for further understanding academic continuity in this complex context (Clough & Nutbrown, 2007; Creswell, 2007; Mertens, 2005).

A collective case study: Students and their mathematics teachers

Students who wanted to continue their study in mathematics were selected for this project because previous research indicated that this is one of the more difficult domains in which to learn and progress independently. Students absent from school miss instructional learning opportunities and are likely to suffer from gaps in their understanding which impede further learning (Chekryn, Deegan, & Reid, 1987; Shiu, 2001). Sociocultural perspectives on mathematics learning view it as 'an inherently social activity', where communication is important (Schoenfeld, 1994, p. 62). Research has identified that studying mathematics in isolation is not usually effective; collaborative learning and frequent interaction between teachers and students are required (Gadanidis, Graham, McDougall, & Roulet, 2002; Kennedy, Ellis, & Benoit, 2007; Reeves, Vangelis, Vevera, Jensen, & Gillan, 2007).

A collective case study with 22 participants was chosen: Years 10, 11 and 12 students seeking to study mathematics, and their teachers at school. Each case was defined as a student-and-teacher pair. The students had been referred to RCH Education Institute or the *onTrac@PeterMac* program for the duration of their absence from full-time school attendance. The choice of cases was made conceptually (rather than representatively) to enable opportunities to examine academic continuity from different angles (Miles & Huberman, 1994). The ability to compare and contrast a variety of aspects and issues across a number of cases (Stake, 2006) selected specifically for their diversity, was also important to provide the opportunity to develop implications for practice in the educational support of students with different types of chronic illness and varying patterns of absence from school.

This study sought to answer the following central research questions:

1. What concerns did students and their teachers have about continuing mathematics study during absence from school owing to chronic illness?
2. What were the perceptions of students and teachers about their interactions during absence from full-time school attendance?
3. What were facilitators of and impediments to students' access to and utilisation of opportunities to learn effectively?
4. How was the degree of academic continuity experienced by students related to outcomes for students and teachers?

Data Collection

Whilst aiming to utilise opportunities to collect data from as many sources as possible, it was essential

to remain sensitive to the dignity of students and aware of their need for privacy and emotional space at times. Remaining attuned to their fluctuating state of health and the appropriateness of involvement during a potentially distressing and vulnerable period of time was necessary.

Initial data about each student's and teacher's individual concerns, interaction preferences and perceived support needs were gathered using questionnaires containing a variety of open- and close-ended questions with opportunities for additional comments. Based on a student's and their teacher's common selection of communication media to trial, resources were provided as required (for example, notebook computers with internet access during hospital stays, webcams for videoconferencing, graphics tablets, headsets, desktop microphones, and wireless microphones for teachers), initial training given, and trials organised. Some interactions were observed firsthand, such as in the hospital with a student or at school with a teacher and class.

Throughout the interactive phase of the data collection informal conversations and observations provided ongoing data about the nature, frequency and regularity of interactions between each student and teacher. Once students returned to school full-time or the end of the academic year was reached, semi-structured interviews were conducted individually with the student and with their teacher. These provided opportunity for the students and teachers to reflect on their interactions with each other, their teaching/learning experiences and the outcomes of their involvement, such as the student's mathematics results, sentiments about future study, and the teacher's perceived changes to their educational perspectives or teaching practice. Interview schedules were designed to encourage students and teachers to articulate their views on specified issues, to raise their own issues, and for the interviewer to explore emergent themes. Sample questions are listed in Table 1.

Table 1. Sample questions from semi-structured interview schedules

Sample questions for students

Would you be able to tell me how much school you missed this year?
 Overall, how did you find studying Maths this past year compared to other years? What sorts of things did you do to study?
 How often would you study Maths in hospital or at home? Did your parents get involved in any way?
 In what ways did you keep in touch with your Maths teacher while you were absent from class? What was the main priority for you?
 How did you prefer to communicate with your teacher and class? Was there anything in particular that helped you learn Maths?
 Did any of your friends help you to keep up with Maths work? What did they do?
 Did you have any other support such as a tutor, a visiting teacher or access to websites?
 How did you find trying to continue with your Maths work while you were not at school full-time?
 Was there anything you disliked about learning Maths while absent from class? Was there anything you liked?
 How do you feel about the way you coped with Maths study this year and your results?
 How do you feel about Maths next year?
 What advice about Maths would you give to a student your age who is about to spend time in hospital / away from school? What advice would you give to their Maths teacher?
 Do you have suggestions for improving ways of supporting students with their Maths studies while they are absent from school?
 Are there any other issues or information you would like to bring up?

Sample questions for teachers

For how long was your student absent from your Maths class this year?
 As a teacher, how did you feel about remaining involved with your student during their absence from school?
 What was the main priority for you in keeping in touch with your student?
 How did you and your student maintain contact while they were absent from class? Did you prefer to communicate with your student in a certain way?
 Did you find anything that helped your student to continue their learning in Maths?
 Was there anything you found hard or frustrating about trying to support your student's progress in Maths?
 Did your school provide any additional support for you to help you manage?
 What do you think about your student's overall progress in Maths this year?
 Do you think that your student will be able to handle Maths study next year?
 As a teacher, how did you personally find this experience with your student?
 Do you think that your perspectives on education or teaching have been affected in some way?
 Would you do anything differently if you had another student absent with chronic illness?
 What advice would you give to a Maths teacher who has a student about to miss school for a prolonged period because of chronic illness? What advice would you give to the student?
 In terms of learning in Maths, how would you rate the effectiveness of using technologies in this context as a means of communication between a teacher and an absent student?
 Do you have suggestions for improving ways of supporting teachers who have a student with chronic illness?
 Are there any other issues or information you would like to bring up?

The unpredictability of each student's hospital stays or appointments, and the changeability of their level of health at a particular moment meant that focus-group interviews with students were found to be unsuitable for this project.

Data analysis

Analysis of data from the collective case study was based on individual examination of each student-and-teacher case as well as a comparison across cases. Findings are based on data analysed through line-by-line coding and pattern searching and on direct interpretation of observations (Stake, 1995). The computer analysis software program 'NVivo' was utilised for interpretive coding, pattern searching, grouping of codes into conceptual sets, memo writing and graphical modelling. Data were coded from students' and teachers' questionnaires and interview transcripts, and the researcher's journal of observations and reflections (Bazeley, 2007). Coding was undertaken throughout the project to enable emergent analytical themes to re-shape perspective, improve instrumentation, and allow for additional data collection to fill in gaps (Miles & Huberman, 1994).

Discussion

The findings of the previously mentioned *CYCLE*, *WellCONNECTED* and *Back on Track* projects and data from this study have highlighted that many young people with chronic illness *want* to continue with their academic studies during absence from school. Emergent themes have related to the potential for academic continuity of such students through ongoing connection with their teachers and peers. Discussion of themes relating specifically to independent study and the learning and teaching of mathematics through online interaction are discussed elsewhere (Wilkie, 2010). Issues surrounding the use of technologies for connection between students and teachers are explored elsewhere (Wilkie & Jones, 2010).

The following discussion, using the central research questions as a framework, focuses on the experience of Years 10, 11 and 12 students seeking academic continuity in mathematics and their teachers at school who were willing to support them. The first section considers the concerns of students and teachers about mathematics study during absence from lessons and draws on questionnaire data. The second section examines the perceptions of students and teachers about their interactions with each other using different types of communication media, based on conversations, observations and interviews. The third section describes a model created as an analytic tool to visualise the pattern and purpose of interactions and to assess the degree of academic continuity experienced by students. The final section explores the relationship between the degree of academic continuity experienced by students and the outcomes for students and their teachers.

Continuing study despite chronic illness: Concerns of students and their teachers

The two major concerns of students regarding their absence from mathematics lessons were missing out on hearing the teacher's explanations and on being able to copy down notes in class. These activities were also listed by all of the teachers as high-use strategies in their lessons. Being able to ask questions or to seek individual help from the teacher were also of concern to a majority of students. There was a noticeable correlation between students' favourite learning strategies and their issues of highest concern about being absent from lessons. Students were also asked to consider the issues they faced when attempting independent study at home. Concern about not having enough energy to keep up with the work elicited a surprising range of responses: it had been anticipated that more students would consider ill-health a problem. Of the six students with cancer, only one reported lack of energy as being 'most hard' to manage. Another student had been diagnosed with chronic fatigue syndrome and yet only found it 'somewhat hard' to manage study. One student underwent haemodialysis twice a week all year and a major side-effect was fatigue, yet he indicated that he did not find it hard at all to study. All of the students indicated that not being able to ask questions while studying was an issue and a majority struggled to figure things out for themselves. This supports socio-cultural perspectives on learning mathematics that view collaboration and interaction as important (Gadanidis et al., 2002; Kennedy et al., 2007; Reeves et al., 2007).

Teachers all indicated that they made high use of explaining and stepping through solutions on the board in lessons, so it is perhaps unsurprising that majority expressed a high level of concern about students missing out on those activities. A majority of teachers were also concerned about students missing out on working with their peers on problems. Most teachers were also worried about trying to assess their students' progress given their absence from tests and examinations and about how to provide a tailored learning program for their student.

A majority of teachers expressed a high level of concern about their students struggling to keep up-to-date with work during absence from school. There was a full range of responses to the concern about being informed of students' health issues. Three teachers who indicated a high level of concern all had students undergoing treatment for cancer. Another teacher of a student with cancer initially expressed a low level of concern yet in a later interview, explained that he found it frustrating 'not knowing exactly what to do. How hard should you push a student when you don't know how ill they are?' (Mr A, Q2.4, 30/10/2008). Such concerns have been highlighted by previous research (Fels et

al., 2003; Campbell & St Leger, 2006).

Teachers' responses to potential issues about using technologies to maintain connections with their students indicated at least some concern about learning how to use them. A majority were also concerned about workload pressures and not having enough time to maintain connections with their student. Workload issues for teachers supporting students with chronic illness have also been described in the literature (Fels et al., 2003; Cook, 2005; Campbell & St Leger, 2006).

Making connections: Types and purposes

Types of connection scenarios between students and their teachers included: email exchanges; telephone conversations; videoconferencing between a student (in hospital) and their teacher and class during mathematics lessons; face-to-face interaction during a school (or home) visit; one-on-one online tutoring of the student (hospitalised or at home) by their teacher outside of lessons; video-recording of lessons by the teacher; and passing work between hospital or home and school.

Email was used widely and was generally the students' preferred communication medium: teachers provided a variety of resources or information such as lists of chapters or schemes of work, handouts, assessment tasks, and updates on the class's progress. Yet its purpose was mostly for the exchange of information and "keeping in touch" rather than for teaching and learning interaction. Students and teachers unsurprisingly preferred one-on-one face-to-face connection during a school (or home) visit for teaching and learning but this was not always possible in some cases and at some times: a student's level of health prevented such interaction. Weekly videoconferencing with his teacher and class during mathematics lessons was an effective alternative for a student in hospital two days every week for haemodialysis. Online tutoring was another viable option in which several students were interested, but some teachers declined trialling it. A majority of students preferred not to converse on the telephone; two students wanted to, however, but their teachers declined. Video-recording of lessons, desired by several students possibly because of its flexibility, proved to be unsustainable for individual teachers to implement without significant support from school ICT personnel.

Some types of interaction supported students' mathematics study by ensuring they had the resources and information to be able to focus their learning attempts. Yet even the most independent learners lamented the lack of interaction with their teacher that constituted "an opportunity to learn":

'On my own, like if I needed help, I couldn't just ask the teacher.' (B, Q6.4, 27/11/2008)

'It was hard doing stuff and not having a teacher there to show me how to do it.' (C, Q3.3, 24/11/2008)

'It frustrated me a bit because I had no one, no teacher to actually give, umm, how can I say it, a proper understanding of where I am up to in all my maths.' (E, Q7, 5/11/2009)

The students' desire for interaction with their teacher to be able to learn mathematics effectively supports socio-cultural theories that advocate mathematics learning as 'inherently social' (Schoenfeld, 1994, p. 62).

Because the definition of academic continuity includes the notion of *access to opportunities to learn*, building a picture of students' subsequent degree of academic continuity during absence from school required consideration of not only the types of interaction students were able to utilise but also the frequency and regularity of the actual connections made.

Judging degree of academic continuity: an analytic model

Early in the project, it became noticeable that there were necessary conditions to meet in order for a particular connection to succeed between a student and teacher. The process of meeting these was a repeated and often tentative process. There were also two major purposes for connections: information exchange, and opportunity to teach and learn. An analytic model (Figure 1) was created

and developed to combine these two conceptualisations: meeting necessary conditions for each connection and capturing the purpose of that particular connection. The model was to describe a means of measuring the quality of each connection and to also provide a visual picture of the nature, rate, frequency and regularity of connections throughout a student's absence from full-time school attendance.

Will the student and teacher connect?

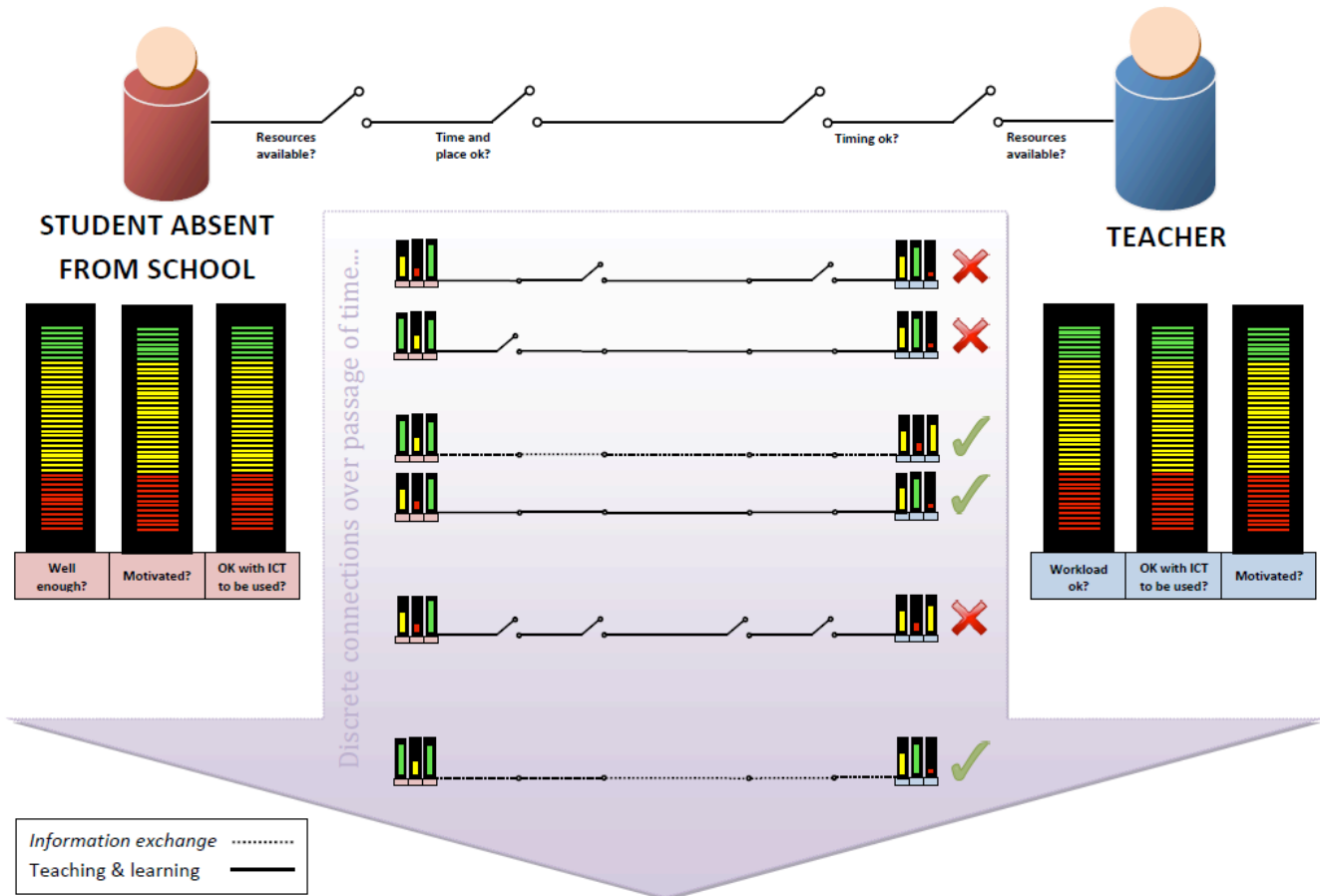


Figure 1. Visualising the repeated process of students and teachers trying to connect with each other

The large downwards arrow between the student and teacher represent the passage of time over the school year. Each horizontal line, if unbroken represents a connection that was actually made between a student and teacher (the green tick on the right). Like switches on a circuit, certain conditions for the teacher or the students could prevent a connection, such as if the student was being seen by medical staff then, or if a hospital laptop was unavailable, if the teacher had a school event at that time, or if they could not access a computer. The "volume" meters on either side of each horizontal line relate to the well-being status of the student and teacher; a lower "volume" (in the yellow or red) indicates an issue likely to affect the quality of the connection. The three volume meters for the student and for the teacher were ordered from left to right according to what was perceived to be the priority. For the student, their level of health appeared to of primary importance whereas for the teacher, it was current workload pressures. For students, their level of motivation seemed to be more of an issue than their confidence with the communication medium to be used whereas for teachers it appeared to be vice versa.

The analytic model was applied to each case to create one-page diagrams mapping the connections between each student and teacher over the course of the school year. Figure 2 is an example.

Presentation at the conference will include discussion of these diagrams and their use in making a judgement of the *degree of academic continuity* (no, very low, low, medium, high, very high) considered to have been experienced by each student.

With-in case and cross-case analysis highlighted some of the complex issues surrounding students' access to and utilisation of opportunities to learn. Cases were compared and contrasted to identify potential facilitators of and impediments their experience of academic continuity. These are discussed in the next section.

Finding facilitators of and impediments to academic continuity

It is noteworthy that a majority of students were self-motivated and this facilitated academic continuity: they wanted to continue their learning in mathematics and they also utilised the opportunities to which they had access. This is unsurprising given that they chose to participate in the project because of their interest in mathematics study (most of them also sought to continue their study of some other subjects). Although several students perceived that they had a strong ability in mathematics it seemed that the ability to learn mathematics *adeptly* was an additional facilitator for some of those students: although they also struggled with independent learning, they were yet able to maximise the benefits of occasional teaching and learning opportunities. Four students experienced periods of ill-health or fatigue which obviously impeded their ability to utilise opportunities to learn. Three students who underwent treatment for cancer surprisingly perceived the disruption of ill-health as minimal and therefore quick recovery from treatment was viewed as facilitating their ongoing study.

Several facilitators related to the teachers were conceptualised as 'willingness' in response to requests for support: willingness to address their concerns about students with chronic illness or willingness to interact in different ways with their students. Taking this willingness one step further to actually *implementing* interaction seemed to require the absence of other impediments. For example, one teacher said he was willing to send resources to his student, yet did so rarely even despite repeated requests, and this seemed to be impeded by his concerns about his student studying while he was undergoing cancer treatment: 'I just felt for the kid, to be honest. I thought, "Why are you doing this stupid maths when you're so ill?" to be quite honest' (Mr A, Q6, 30/10/2008). Another teacher was similarly concerned about his student but rather than avoiding interaction, sought advice from the student's Head of House (who then contacted the hospital education advisor). Once reassured, he began sending resources to his hospitalised student and tutored him online until his student's deteriorating health impeded further interaction. Another teacher was willing to video-record lessons but a lack of school resources and workload pressures impeded his sustainable implementation over time. Another teacher was willing, even eager to interact with her student using online technologies and she also had a high level of confidence. Unfortunately the technical inability of her school network to support videoconferencing impeded her efforts to interact online, and her workload pressures seemed to impede other support such as video-recording of lessons.

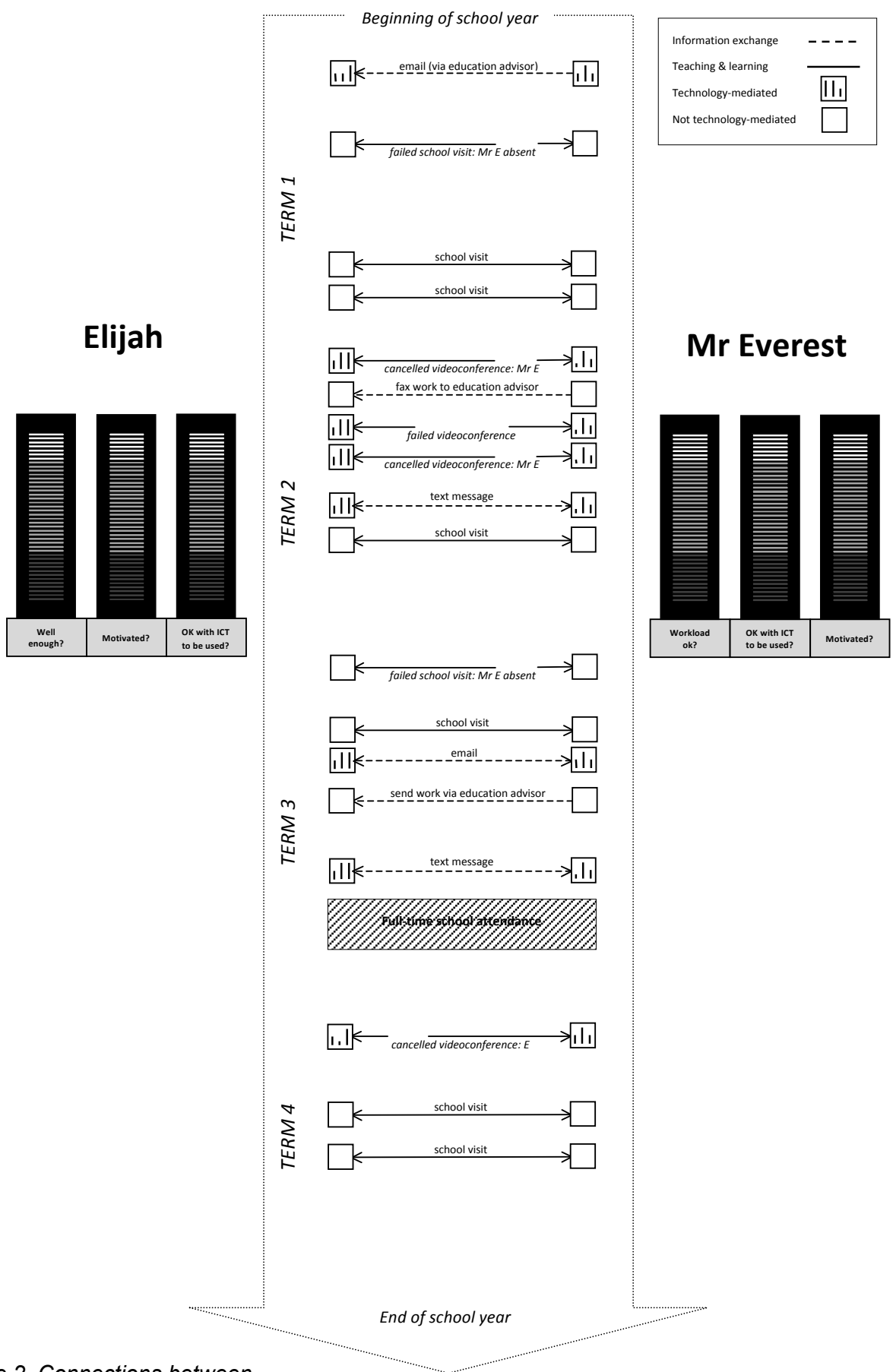


Figure 2. Connections between



Elijah and Mr Everest

A significant impediment for those students who underwent cancer treatment was the lack of confidence of their teachers to *initiate* contact with them: their teachers preferred to wait for specific direction from the hospital education advisor. One teacher was the exception: when her student was first absent from lessons, she sought advice from her student's Head of House, developed a modified learning program and emailed her student to see what he thought about it, and then continued to initiate frequent and regular email contact over several months. Her reassurance and encouragement were noticeable facilitators of the student's experience of academic continuity: he said that 'there was never any pressure and that sort of helped' (K, Q10.4, 25/8/2009). Upon his return to school he said, 'I found it surprising how easily I slotted back in, like I didn't, I thought that when I'd get there, I'd get a massive build-up of work. But it sort of, like I haven't, I haven't struggled with anything' (K, Q8, 25/8/2009). When asked about her confidence in contacting her student and knowing what to say or do to support him, she explained that she herself had been through cancer treatment: 'I know – how important it is to try and get back to normal as soon as possible' (Ms K, Q4.3, 25/8/2009). In three cases, students' lack of response to emails, as perceived by their teachers, was considered an impediment to their experience of academic continuity: their teachers highlighted it as an issue and were upset or disappointed by it. Not receiving a response from their student had been interpreted in a negative light by teachers, which discouraged or even diminished their willingness for further initiative or involvement.

There is some indication that a low level of technological confidence was related to teachers' reluctance to trial some types of online interaction such as videoconferencing. Again, one teacher was the exception: he professed a low level of confidence with technologies (he also had a full teaching load with additional responsibilities) and yet was both willing and able to videoconference successfully during lessons (two days per week) with his student for the entire school year. He indicated that a responsive school ICT department and technology tutoring from other students in the class facilitated the interaction. In five cases, technology-related issues and failures acted as impediments to students' academic continuity because they hindered the implementation of teaching and learning interaction and therefore students' access to opportunities to learn.

Considering the outcomes: Progress made, future study, and teachers reflecting

In terms of outcomes for students, although a majority obviously were considered to have made less progress than they would have had they been at school, a higher degree of academic continuity was associated with greater satisfaction about perceived progress for both students and teachers. Three students who experienced a high or very high degree of academic continuity expressed a positive view of their progress during their absence from full-time schooling. One student said she was relieved that she was able to catch up to her peers and attributed it to her teacher's tuition during home visits. Another was satisfied with his efforts to keep working throughout his absence and also appreciative of his teacher's consistent involvement. One student said that he had also done better than he expected, but that his comment applied to his result in mathematics, not his other subjects (only his mathematics teacher agreed to videoconference with him). These positive responses by students to maintaining academic study and connection with school are similar to previous research findings (Fels et al., 2003; Cook, 2005; Shute, 1999). Two students, who both experienced a low degree of academic continuity for a prolonged period of time during cancer treatment, were judged by their teachers to have made little progress. Although they had each *utilised* their opportunities to learn, they had been given very little access to such opportunities during a year of absence from school.

With the exception of two students who completed Year 12 while participating in the project, all of the students faced future mathematics study. Although some students expressed concern about their choice of subjects (and some were encouraged by their teachers to choose less rigorous mathematics subjects the following year) or their ability to cope with future study, there was a unanimous sense of looking forward to returning to school. Even those students who were considered to have experienced no degree of academic continuity expressed determination to return to school and "do well".

Teachers' reflections on their experiences indicated that a higher degree of academic continuity experienced by their student was associated with a greater sense of satisfaction on the part of the teachers: they had benefited their students and it had meant something to them personally as well. One teacher said, 'I enjoyed the experience because it's nice to see, you know when you've got a student like that... With her, like, it wasn't a burden...it was pleasant' (Ms J, Q7.1, 30/7/2009). Another teacher said, 'It was just a pleasure to be part of it all, and, you know, and to see Faraji, the way he has, the fact that he continued on with his, with his work, was great, you know' (Mr F, Q10, 22/10/2009).

Regarding perceived changes to their educational perspectives or teaching practices, only two teachers explicitly indicated that they would change their future approach to supporting students with chronic illness, although there was some hint by another teacher that he would increase his interaction with his student were she to be in his class again. They referred to their intent of being more organised with handouts and set work so that students who are absent still receive them. One teacher also said that he would make more of a concerted effort to utilise videoconferencing if he had another student absent from school.

Only one teacher indicated that his day-to-day teaching practice had been affected by his involvement with his student: he said that he wanted to ensure that he could communicate with all students absent from lessons, even if only for two or three weeks, and that he would monitor their progress more closely. Whether owing to her experience of supporting a student with cancer, her own experience with cancer, many years of teaching students with chronic illness, or other reasons, one teacher mentioned her ambition of becoming a hospital volunteer teacher upon retirement: 'Make myself available and say, "I'm a maths teacher. How many kids have you got who are in this situation? I'm here to help."' (Ms K, Q11, 21/8/2009).

Conclusion

There are multi-faceted issues and concerns when a young person is unwell and absent from school – a complex context intersecting medical and educational domains, made even more so because they are more likely to be in and out of hospital and receiving treatment or recuperating at home and experience prolonged or accumulative absence from school. Yet many these students want to remain a part of their school community and to be included socially and academically – to be "counted in". Strategies that support their ongoing learning, that can be sustained technologically and that can be managed practically, are sought. The intent of ongoing research is to consider if and how academic continuity can be maximised for children and young people by helping them maintain connections with their teachers, peers and schools.

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