

Hospitalized adolescents' use of mobile technology for learning, communication and wellbeing

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Hospitalized adolescents' use of mobile technology for learning, communication and wellbeing

Abstract

Adolescents who are hospitalized experience a number of significant needs beyond medical treatment including: emotional support for anxiety and stress, academic and educational support for learning and social support to reduce isolation. As a means of reducing the isolation and disrupted educational experiences, we explored the use of mobile technologies to connect children to schools, classmates, and families. The aim of this study was to investigate the use of mobile technologies in relation to learning, connection and wellbeing of the adolescents. This qualitative study represents the perceptions of 18 hospitalized adolescents, 29 teachers and 4 parents about the affordances of mobile technologies in a hospital setting. Overcoming ethical, practical, and methodological challenges the results of the study suggest that the use of mobile technologies played a critical role in the education of the hospitalized students: in keeping them up-to-date with schoolwork; helping overcome social isolation brought about by changes in communication; influencing wellbeing through the use of mobile technology as a therapeutic tool. The paper also discusses the challenges of how best to support vulnerable youth while at the same time protecting them from less positive aspects of technology.

Keywords: hospitalized adolescents, mobile technologies, learning, communication, wellbeing

Introduction

Advances in medical research and the treatment of many chronic and life-threatening illnesses have resulted in an increase in the number of children and adolescents living longer with these conditions (Shiu, 2001). These children face many challenges as a result of their illness and hospitalizations. They become socially isolated from their families, classmates, and

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2
3 friends and from the routines of everyday life (Hopkins *et al.*, 2014) and need strong academic
4
5 and social support during recovery to help overcome their isolation (Bonny *et al.*, 2000; Taylor,
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7 Gibson, & Franck, 2008). With increased availability of technologies providing access,
8
9 communication and interaction, judicious integration of technology may offer opportunities for
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11 learning to hospitalized children who would otherwise be disconnected from their enrolled
12
13 schools. A review of literature that examined the use of technologies to address both social and
14
15 educational aspects of learning with hospitalized children found preliminary evidence for
16
17 technology as a means of supporting education and social wellbeing of hospitalized youth
18
19 (Authors, 2015). However, most studies in this review investigated technologies designed
20
21 specifically for hospitalized youth and fewer took advantage of technologies that are now readily
22
23 accessible. Currently, technology that affords communication, flexibility, accessibility and
24
25 multifaceted usage exists through mobile Web 2.0 technologies (Cavanaugh, Author, &
26
27 McCarthy, 2014); therefore, research examining use and adaptability of off-the-shelf mobile
28
29 technology for youth in hospital context is needed. Careful consideration of how mobile
30
31 technologies can be used to support the educational and social needs of hospitalized youth who
32
33 experience isolation and disrupted schooling is the focus of this paper and an area deserving
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35 further discussion.
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Review of Literature

Hospitalized Adolescents' Needs

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46 Adolescents who are hospitalized for chronic or serious health conditions experience a
47
48 number of significant needs beyond medical treatment including: emotional support for anxiety
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50 and stress; academic and educational support for learning; and social support to reduce isolation.
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52 Prolonged absence from school can cause severe barriers to learning (Martinez & Ercikan, 2009)
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3 and thus high anxiety and stress to the child. Students may be concerned about keeping up with
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5 coursework they are missing and completing school expectations. According to St Leger (2012),
6
7 for education professionals, “the heart of supporting students with chronic health conditions is
8
9 maintaining their connection to school and friends and providing support to their families; their
10
11 priority is the young person’s wellbeing rather than academic performance” (p.7). It was noted,
12
13 however, that maintaining social connections could be challenging when faced with long
14
15 absences from school. The risk of decreased in motivation to continue with schoolwork while
16
17 experiencing isolation can have a critical effect on children and add to learning difficulties.
18
19 Maslow and colleagues (2011) reported that “Young adults growing up with chronic illness ...
20
21 are at increased risk of poorer educational and vocational outcomes” (p. 206). Also of concern
22
23 are “year 12 students who are experiencing stress of exams and, at the same time, stress
24
25 associated with cutting ties with health professionals who have supported them for many years”
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27 (St.Leger, 2012, p.6).
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34 Children who experience repeated hospitalizations tend to undergo trauma not only
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36 physically but also emotionally and socially. In addition to limited contact with families and
37
38 missing the routine of school-life hospitalized children need to accept the rules and limitations of
39
40 the new environment. This can further create a negative impact on their wellbeing (Hopkins *et*
41
42 *al.*, 2013). Wellbeing is considered here a multidimensional construct incorporating all domains
43
44 of individual functioning including: physical, psychological, social, and cognitive/educational
45
46 (Moore *et al.*, 2011). Each domain comprises multiple constructs and so, for example, the
47
48 physical domain includes the following subdomains: overall health status, the presence or
49
50 absence of chronic conditions such as asthma, diabetes, health risk behaviors, such as eating
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52 disorders, and health promoting behaviors. Psychological wellbeing addresses how children
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2
3 think about themselves and their future and how they handle and cope with situations. Social
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5 wellbeing includes basic social skills, time use and the ability to relate emotionally to people and
6
7 includes the parent-child relationship, engagement in activities, and presence of negative and/or
8
9 positive social behaviors such as bullying, or resolving conflicts. Educational wellbeing includes
10
11 subdomains: school problems such as grade repetition, learning difficulties, parental concern
12
13 about child's achievement levels, and child's interest in reading for pleasure (Moore *et al.*, 2011).
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17 Being separated from family and peers increases children's isolation and disrupts
18
19 friendships and family engagement. For teenagers, when social engagement is critical for their
20
21 wellbeing and confidence (Hopkins *et al.*, 2014) this can contribute to significant unhappiness
22
23 (Palmer *et al.*, 2007). Maintaining connections and addressing educational need not only
24
25 improves quality of life and minimizes educational disadvantage but it also gives students a
26
27 sense of normalcy and increased hope, reducing risk and the impact of isolation (Wilkie, 2011;
28
29 Yates, 2012).
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Use of Mobile Technologies

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35 As a means of reducing the isolation and disrupted education experiences, researchers have
36
37 increasingly explored mobile technology use to connect children to schools, classmates and
38
39 families (Gonzalez, Toledo, Collaazos, 2014). Maintaining young peoples' academic and social
40
41 connections can reduce the difficulties they experience when they return to school (Fels & Weiss,
42
43 2001). Both regular school attendance and quick return to school have been identified as beneficial
44
45 in helping children cope with hospitalization and chronic illness (Rae & Frankel, 1998; Stuart &
46
47 Goodsitt, 1996). Technologies continue to become more affordable, accessible, and powerful,
48
49 challenging educators to identify how best to connect students with their schools and facilitate the
50
51 interaction necessary to promote effective learning (Wilkie, 2011). Research is needed to examine
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2
3 the different ways that technologies support both educational and social connection and
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5 communication, and how this, in turn, helps overcome educational disadvantage and enhance the
6
7 positive wellbeing of hospitalized children.
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10 Merolli and colleagues (2013) have written about the value of using affordance theory –
11
12 suggesting that individuals have different perceptions about the potential uses that technology
13
14 affords — rather than attributes of technology to examine how mobile technologies were used to
15
16 meet individual needs. As the application of affordance theory has evolved, these researchers have
17
18 used affordance theory as a lens to investigate how chronic disease sufferers, for example, use
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20 social media in relation to their individual needs. In our study we wanted to examine the
21
22 affordances of mobile technology as perceived by students, parents, and teachers in relation to how
23
24 these can best serve hospitalized adolescents.
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29 Findings from the Keeping Connected research (Yates *et al.*, 2010) showed that young
30
31 people in hospital are concerned with maintaining normal routines as much as possible and
32
33 consider access to social networking sites or mobile phones an essential component of being
34
35 normal. Evaluation research documents frequent and widespread use of social networking sites
36
37 by young people across hospital to build social and learning communities (Nisselle *et al.*, 2012).
38
39 In a synthesis of current findings on adolescents' use of social networking sites and its impact on
40
41 psychosocial development and wellbeing, Shapiro and Margolin (2014) found several positive
42
43 influences that included enhanced peer relationships, more opportunities to engage with a wider
44
45 range of groups and peers, and increased occasions for self-disclosure. In addition, other research
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47 has found that an increased sense of connectedness with school is a significant factor in a future
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49 sense of wellbeing for all young people (Jose & Pryor, 2010).
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Previous studies have found that the use of video for social connection may improve social presence by providing an audio and visual connection, especially for remote students (Weiss *et al.*, 2001; Wilkie, 2014). However, the findings related to video use are not consistently positive. Some researchers also noted resistance on the part of the sick child to being seen and by parents concerned that their children might find visually confronting pictures of the sick child distressing (Ellis *et al.*, 2013). For the most part, keeping in contact using technology helped hospitalized students feel more confident about their reintegration into school and about their future (Hopkins *et al.*, 2014; Yates, 2012).

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Previous research on specially designed projects to connect hospitalized students with their enrolled teachers has highlighted a number of practical and procedural challenges. For example, Cook (2005) evaluated a virtual classroom package called Manhattan and found that despite receiving training it was too complex and time consuming for teachers to use. Wilkie (2013) reported on the feasibility of using a variety of existing resources including email, videoed lessons, interactive whiteboard, and videoconferencing for interaction between senior secondary students and their mathematics teachers to achieve academic continuity. Findings in this study highlighted students' desire to stay connected to school and focus on academics with teachers expressing concerns about students' ill-health and reservations about their ability to cope with schoolwork. Student lack of motivation or perseverance was related more to lack of access to a teacher than it was to their level of health. Wilkie (2013) noted the importance of providing teachers with time and resources (technical training and IT support) to implement and sustain the interaction with the student over time.

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In a systematic review of the use and effectiveness of social media in child health, Hamm and colleagues (2014) noted that many studies showed the promise and utility of social media as

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3 an intervention but this was not supported by the statistical significance of the results. Research
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5 describing how teachers and adolescents use mobile technologies and social media to support
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7 educational, social connection, and wellbeing needs (Authors, 2015) coupled with qualitative
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9 evaluation of its perceived strengths and limitations is needed (Hamm *et al.*, 2014). The purpose
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11 of this paper is to describe how mobile technologies affect hospitalized youth in feeling
12
13 connected, overcoming isolation, enhancing wellbeing and addressing educational needs.
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17 This qualitative research provides student, teacher, and parent perspectives on the
18
19 following research questions organized under these themes:
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Technology and Learning

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24 How does technology influence hospitalized students' learning?
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Technology and Connection

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29 How does technology use influence hospitalized students' connection and
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31 communication with their enrolled school?
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34 How does technology influence students' social connection and communication with
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36 friends and family?
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Technology and Wellbeing

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41 How does technology influence hospitalized students' wellbeing?
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Methods

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46 Conducting research in a hospital setting presents a number of ethical, practical, and
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48 methodological challenges. It was vital to remain respectful of and sensitive to the wellbeing and
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50 dignity of the adolescents during a traumatic and vulnerable period of their lives. Given the
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52 complexity and unpredictability of their treatment schedules, length of hospital stays, and student
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54 ability/wellness to participate in different types of data collection, some data collection was
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3 hampered. These ethical dilemmas, organizational and practical challenges have been noted by
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5 other researchers who are interested in providing hospitalized students the opportunity to share
6
7 their experiences and needs (Coyne, Haynes, & Gallagher, 2009; Authors, 2015; Wilkie, 2011).
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10 Despite the barriers, ethics approval was sought, obtained and data were collected from multiple
11
12 sources (students, teachers, and parents) in order to describe hospitalized youth's experience with
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14 mobile technology and learning, technology and connection, and technology and wellbeing. On
15
16 reflection, we were mindful of the different practical and ethical requirements, as well as
17
18 methodological considerations.
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22 Data came from semi-structured interviews conducted with 18 hospitalized adolescents
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24 (see Table 1 for demographic information about student interview participants and length of
25
26 hospital stay), 29 participating teachers, and four parents. In all interviews we asked participants
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28 how they used mobile technology in the hospital setting; whether and how it was used and
29
30 helped in student learning; whether and how it was used to communicate with enrolled school
31
32 teachers and classmates, friends, and families; and whether and how it had helped them in
33
34 general in dealing with the challenges of the hospital stay. Each stakeholder group was also
35
36 asked additional questions specific to their role in relation to technology and learning,
37
38 communication, and student wellbeing. Furthermore, questions were open-ended and allowed for
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40 additional prompts and detailed descriptions of personal experiences by respondents. Interviews
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42 were audiotaped and transcribed verbatim.
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Data Analysis

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49 Steps taken for this analysis included: (1) an initial reading and open coding of all the
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51 relevant data (Emerson, Fretz & Shaw, 1995), during which we noted instances or evidence of
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53 influence of use of mobile technology on "learning," "communication" and "wellbeing;" (2) the
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development of a code list based on our initial reading of the data; (3) focused coding of all the data using the code list; (4) then classifying and interpreting with key themes emerging from this process across all stakeholder groups (Creswell, 2007). Information from multiple sources of data and analysis by both researchers enabled triangulation of themes increasing the reliability and validity of the outcomes. This process provided rich data on the students' experiences.

Table 1

Student Interview Participants

Student	Age	Year/Grade	Time in Hospital	Most Challenging Aspect of Stay
S1	14	9	2-3 days	'hooked up to two drips, can't move'
S2	12	7	6 days	"boring, nothing to do"
S3	13	8		miss school friends
S4	15	9	2 days	--
S5	14	9	4-5 days	Miss friends and school
S6	17	12	Few days	No internet, the schedule, would rather work at night.
S7	15	9	1 day	Bored-waiting around. Miss friends
S8	15	10	3 days	Boring, No Wi-Fi or internet
S9	15	10	2 days	Being bored. Miss friends from school
S10	15	10	7 weeks	Isolation from everyone. Miss people from school
S11	13	7	1 day	Boring
S12	12	7	1 day	Pain. Miss being with friends from school
S13	16	10	5 days	Bored
S14	14	8	3+ weeks	--
S15	16	11	1.5 weeks	Miss friends, normality and routine
S16	13	8	4 weeks	Not being at home, not seeing my friends, not being in school
S17	15	10	3 days	Miss "hanging around my mates"
S18	14	10	5 days	Miss the Internet to contact friends.

Results**Interviews**

To answer the question about how technologies influence hospitalized students' learning we analyzed the student, teacher and parent interviews. The following themes emerged:

Importance of education and keeping up with school; technology's affordances for the hospital setting; unpredictability of student schedule/stay and its impact; changes and concerns brought about by technologies.

Technology and Learning

Importance of education and keeping up with school. Almost every student commented on the importance of education and stressed the importance of keeping up. A younger student commented:

I reckon it's extremely important just for later in life you want to get a good job so that you can support your family and obviously you'd need to study hard in school and learn lots to then be able to go on to Uni to get jobs later in life. (S-12).

The concern to keep up with education while in hospital is noted and confirmed by the hospital schoolteachers who were clearly aware of the pressure the students place on themselves:

I think it's an amazing gift for the students to keep them in real contact with their school that they don't have otherwise...And for a teacher it's also very useful to be able to immediately plug in to what's happening at school because a lot of our students are very focused on what's happening at school and for example if they were doing a particular short story and I give them something else they'll go 'but ... I want to do exactly the same as they're doing at school'. That's very important to them. (T-07-interview).

This insistence on the part of students to keep up with schoolwork is a recurring theme. One teacher suggested that she could not introduce extra material for the students. In one case they were only interested in watching videos that their enrolled schoolteacher sent them and therefore "there's not a huge scope for me to be bringing in extra stuff" (T-01-interview).

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3 When asked ‘do you feel much pressure to keep up with schoolwork?’, a typical student
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5 response was: “I do, I kind of pressure myself to do well, I want to get good grades but then I get
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7 frustrated because I’m doing school work at home and I don’t have a teacher there to guide me”
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9 (S-13). In fact, the importance of keeping up with schoolwork appeared to be more valuable to
10
11 students than their teachers highlighting students’ desire to be treated normally. For example,
12
13 one student commented:
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17 ...my home teachers, I talked to them before hand and they were saying ‘no, you don’t
18
19 need to do any work’, but I probably would. I brought my iPad because I’ve got different
20
21 educational apps on it and I’ve also got a project that I’m doing at the moment (S-12).
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25 **Technology’s affordances for the hospital setting.** While students were focused on
26
27 immediate task of staying on track with learning doing the same assignments as their peers at the
28
29 enrolled school, teachers were interested in and engaged with a wide range of issues related to
30
31 technology and learning. This contrast in student and teacher perceptions about technology’s
32
33 utility, usefulness, and affordances was notable. Many teachers commented on the advantages of
34
35 mobile technologies and the iPad to involve students especially those who are disengaged:
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39 With our team, a lot of the students have been disengaged with education for a long time,
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41 and the one thing that will easily connect and engage them is the use of technology so the
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43 iPads are becoming increasingly useful (T-22-interview).
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47 Other teachers spoke to additional affordances of mobile technologies that lent
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49 themselves to the unique hospital context and provided needed resources to students. For
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51 example, an advantage of technology is the way it can compensate for some of the limitations
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53 that hospitalization brings:
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3 It's the resources, whether it's software or programs...because in a hospital situation
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5 where the kids don't get out, some of the programs that you can access are just so
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7 valuable because they [the programs] are out there and they can take you to where you
8
9 can't be, to learn about things. (T-11-interview).
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12 Merolli and colleagues described this as the "flexibility" affordance—since web 2.0 technologies
13
14 remove the barriers of geographic location and timing for communication and, in this case,
15
16 accessing or visiting resources.
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19 A different teacher referred to the "identity" affordance which offers hospitalized
20
21 students "more choice and control over how they present and assert themselves" (Merolli *et al.*,
22
23 2013, p. 965). She talked about how useful they were for drama and oral productions. In
24
25 particular, the teacher referred to the ability to record students' performance and share the
26
27 recording via Dropbox. This overcame the problem of students having trouble standing up in
28
29 front of a classroom or delivering a speech. As one teacher indicated:
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34 ...we can often use this just to record their voices, or film them performing their speech
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36 or their part of a play or something.... So that is a way to send back the assessment that
37
38 you never could before (T-07-interview).
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41 ***Unpredictability of student schedule/stay and its impact.*** A consistent finding from both
42
43 teachers and students related to the effects of short or unpredictable lengths of stay in hospital
44
45 and the actual opportunities for technologies to play a role in the student's learning or education.
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47 As seen in Table 1, many students were in hospital for only very short periods of time and, in
48
49 that situation, often did not participate at all in the hospital school services as they were receiving
50
51 treatments or were too unwell to do so. However, when teachers were able to work with students
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53 even for a short period of time, they indicated positive effects. One teacher described how he had
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3 a totally disengaged 14-year-old “switched on and lit up” (T-12-interview) when he showed him
4 how *Stop Motion* worked and asked for project ideas for a *Stop Motion* subject. The student
5 suggested Othello. Having access to relevant information and resources had a motivating effect
6 on teachers and the students they supported. In particular, teachers needed to create meaningful
7 learning opportunities for students in this often emotionally, physically and psychologically
8 challenging situation. Being able to draw from these relevant resources increased the interest and
9 enthusiasm of even the disengaged and reluctant students.

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20 ***Changes and concerns brought about by technologies.*** Teachers also identified another
21 affordance of technology, “structure,” that refers to the architecture of participation and
22 framework that web 2.0 technologies afford (Merolli *et al.*, 2013). They noted that the ability to
23 connect individuals, share information and collaborate has changed the way that students are
24 learning with other students. The teacher noticed that the students were more responsible for
25 their own learning and there was more collaboration going on amongst them as she described:

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34 They’ll perhaps come in and say ‘I need to go in on my class wiki...’ or they’ll say ‘I
35 think we got given a new essay topic this morning, I’ll just message my friend’ and
36 they’ll get their phone and message their friend who I’m sure should have their phone
37 turned off in class, and they’ll message it back. Their friend will even take a photo of the
38 class notes and immediately send it to them. So, that impromptu sharing created an
39 engagement and immediacy (T-07-interview).

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48 The use of mobile technologies in a pedagogically meaningful way requires careful
49 consideration of a multitude of issues and it was evident from our interviews that a couple of
50 issues in particular concerned teachers. One common concern related to the need to balance the
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3 creative engaging aspects of mobile technologies with some of the more traditional, less creative
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5 skills:

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8 There's some wonderful problem solving apps on the iPad, it's got to all be in
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10 context...for example we did an experiment the other day on growing polymers and the
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12 kids were growing them, and working out what was going to happen but they were
13
14 documenting each step with the iPad and taking photos along the way and putting that
15
16 into a document and writing up (T-13-interview).
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20 A second concern that all teachers noted was that of access. A teacher commented on the
21
22 risk of leaving the iPad with the students:
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25 That comes with problems because if you are leaving an iPad which is hooked up to the
26
27 Internet with a kid on bed who is not being supervised, they have to sign off that they
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29 won't go to inappropriate sites, but they're unsupervised and that poses some issues. (T-
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31 12-interview).
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35 In fact, this concern, or rather the hospital's attempt to manage access, was also noted by
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37 students and their parents. When asked what would help in hospital to prevent the student from
38
39 being concerned about falling behind on schoolwork, one student responded: "If they had Wi-Fi
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41 you could get onto ¹Connect and connect with all your teachers and ask for more work or ask
42
43 what they're doing and stuff." (S-02). This was reinforced by another student who indicated:
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45 "Hospital Wi-Fi would be good, I've had to bring in my own internet hub to be able to contact
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47 my friends" (S-10).
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51 With increased use of technologies in education, many enrolled schools have portals
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53 through which students can access information about each of their classes and continue to
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58 ¹ Connect is a server by the local Department of Education for the public school.
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3 participate and stay up-to-date with their schoolwork while in hospital. Yet, not all schools had
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5 the same technology infrastructure and within each school not all teachers participate to the
6
7 same degree. At one enrolled high-tech school where each student was provided a personal
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9 iPad, a student noted that only two teachers uploaded materials and directions to the portal. Not
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11 only were there sometimes issues with teachers not using the portals, but often the portal itself
12
13 required the use of a particular application and this might not be available on hospital
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15 equipment. In addition, problems with Wi-Fi access challenged student access to the Internet
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17 any time outside of school hours. The time restrictions on Internet access influenced not only
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19 students' ability to connect socially but also some students' ability to complete their
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21 schoolwork. For example, one student commented:
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27 I had to do this big assignment on developmental theory for childcare and because I was
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29 only allowed internet during certain periods of the day I found it was so hard to
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31 concentrate on it because I'd want to just sit in my room and do it in my room so I could
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33 just focus on it without having interruptions, but because I had to be in the classroom on
34
35 limited internet, it was just kind of difficult. Because by the time I'd get focused on it
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37 we'd have to go to break (S-6).
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41 **Technology and Connection**

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43 To answer the question, how does technology influence hospitalized students' connection
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45 and communication with family and friends, student and teacher interviews were analyzed. The
46
47 following themes emerged: *technology use and impact on social isolation*; *negotiating the*
48
49 *balance of Wi-Fi access*; and *communication changes brought about by mobile technologies*.
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53 **Technology use and impact on social isolation.** Given that students overwhelmingly
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55 identified "missing friends" as the most challenging aspect of being in hospital (See also table 1),
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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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3 it is not surprising that they also appreciated and used mobile technologies mostly to connect
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6 with friends and family.

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8 It's kind of like you're out of hospital even though you are still here, it makes you feel like
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10 you've got leave or something and you're able to still see them. It makes you feel like
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12 you're a part of their [peers] lives even though you're not really seeing them much so
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14 that's good (S-10).

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17 Another student talked about feeling less socially isolated because he didn't feel as he was left
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19 out:

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22 So talking to them is just is like talking to them in person a little, not the same, obviously,
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24 but it just makes me feel more included, like even though they're going out without me I
25
26 can still talk to them online rather than not talking to them at all (S-5).

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29 Teachers also understood the importance of mobile technologies to support social connections
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31 for their students who were often isolated –especially those who were hospitalized for long
32
33 periods of time. One teacher working on the Oncology ward with long-term hospitalized students
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35 noted that she encouraged the use of Facebook even though it was against regulations:

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38 I encourage them to Skype as well, I encourage them to Skype the other kids on the ward
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40 because they can't even associate with them unless they know them particularly. We do
41
42 try to connect them via Facebook ...we will say 'so and so is in Room 1 and they can't
43
44 come out, Facebook them and introduce yourself' and they do. Because these kids are
45
46 going through the same thing, it's a support system (T-18-interview).

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49 The importance of being able to talk to friends is critical to this age group, so much so that one
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51 student noted: "I went through all of my data (on the iPhone) this month and it's been ...five
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53 days...because I've been talking to my friends so much that it's gone through a lot (S-5)." In fact
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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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3 parents also agreed with their children about the importance of being able to connect socially and
4
5 complain about the lack of internet/Wi-Fi connection. They are even willing to relax rules they
6
7 enforce at home. One mother explained:
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10 I think when you're in an environment like this... they need to connect to friends because
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12 I know she's not on Facebook because I don't allow that but at the same time she's always
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14 in touch with her girlfriends. And, you know, the first thing she wanted to do when she
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16 knew she was staying in, she was a little bit worried about being in here, was tell her
17
18 girlfriends where she was and what's happening (P-02-interview).
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22 **Negotiating the balance of Wi-Fi access.** While technology and open access offers many
23
24 opportunities to support hospitalized children's social connection, the implementation and
25
26 operation of such access presents a conflict for teachers between their "Duty of Care" and desire
27
28 to reduce social isolation (Lambert *et al.*, 2012). Negotiating the balance between open access
29
30 and providing reasonable boundaries to protect hospitalized students appeared to be of concern
31
32 to both teachers and students. The lack of Internet access outside of school time created problems
33
34 for social connection as well as the educational connections mentioned previously and led
35
36 parents and students to complain about the cost of providing their own Wi-Fi access. However,
37
38 some students also commented on some of the less beneficial aspects of constant connection via
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40 social media:
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46 It makes me feel isolated and makes me feel, like, alone [laughs] but sometimes it's good
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48 cause, you know, you get away from all the, like, drama and stuff that your friends are
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50 causing, but at the same time it's bad cause you just want to talk to your friends and see
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52 what they're up to and stuff like that (S-6).
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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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3 Students demonstrated self-awareness and perceptiveness with regard to social media and its
4
5 downsides and dark sides perhaps more than adults give them credit for. The same student also
6
7 commented on the distracting nature of social media: “oh yeah I’ll just check that cause I’m not
8
9 doing too much at the moment, just get sucked into the void of social media.... I call it a black
10
11 hole; you keep getting pulled back into it” (S-6). This student talked about taking steps to avoid
12
13 this by turning off notifications. Another student talked at length about the prevalence of and
14
15 personal experience with cyber bullying. When asked if it would be worse if there were open
16
17 Wi-Fi access at the hospital, this student responded: “I reckon it would... the bullying side of
18
19 things would be worse because people in here have, say, eating disorders or something and
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21 they’re really skinny and stuff, so they could be called names” (S-2).
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27 **Communication changes brought about by mobile technologies.** A significant theme
28
29 that emerged from data was how technologies have changed communications with the enrolled
30
31 school. This now occurred more quickly and teachers were using their own mobile technology
32
33 devices:
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36 That has made life much easier in terms of communication, and much more immediate. I
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38 suspect that teachers have now their emails on their phone or iPad because we’re often
39
40 getting responses within a couple of minutes, whereas before at the end of the day you’d
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42 send an email and then it would go into their Inbox and they might see it that day but then
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44 they couldn’t respond to it until that afternoon (T-07-interview).
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48 Interestingly and perhaps counterintuitively, some teachers used the iPads to get to know
49
50 the students and to initiate face-to-face conversations with them. This seems best represented by
51
52 the affordance “narration” which Merolli and colleagues (2013) described as “the opportunity to
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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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3 narrate their experiences through a variety of channels” (p. 966). As one teacher commented in a
4
5 post interview:
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7
8 It is all about developing a rapport, and because the iPads and apps are generally
9
10 interactive, you can have more discussion and build more rapport. So it is not always
11
12 what they are doing or not doing, it is *how* they are doing it, and developing that rapport
13
14 and connecting with them (T-22-interview).
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16

17 This teacher continued to say that it is not just about learning: “It is about disengaging the
18
19 gaming world and switching them on to some other sort of areas and showing the importance of
20
21 communication, and communicating, and those sorts of skills (T-22-interview).
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24 **Technology and Wellbeing**

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27 Given that wellbeing is a construct comprising all dimensions of individual functioning
28
29 including educational, social, psychological, and physical, it is possible that the support provided
30
31 by technologies contributed to the student’s wellbeing. The main theme emerging from analysis
32
33 of the data related to wellbeing highlighted the use of mobile *technology as a therapeutic tool*.
34
35 The interaction of technology’s affordances—those features that allowed users to distract,
36
37 engage, connect, or learn at any time or place--provided support for the hospitalized adolescent
38
39 during this difficult time and enabled the use of *technology as a therapeutic tool*.
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44 **Technology as therapeutic tool.** Students who were in pain and under medication were
45
46 not always able to focus on academic learning and it was not their first priority:
47

48 I’ve just been more focused on my pain and stuff. It’s [studying] not a huge priority as my
49
50 brain is frazzled from all the medicine and stuff. It just doesn’t really work well... It would
51
52 just get me even more stressed out (S-13).
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Recognizing this, a teacher in the oncology ward described how technology can be used as a distraction at times when students are feeling unwell:

They could do this app and then another app, and then they explore. And that's all right with me if they're not really feeling well, but just to engage them in some way. They go through their stages and they don't have control of what's happening to them medically (T-11-interview).

In fact, for some students, schoolwork was a distraction from pain and a way to focus on what was still normal as described by the teacher in the following way:

One of the boys I've got at the moment he actually expresses that his schoolwork is his escape from this [being in hospital]... It's one thing in his life that can remain normal. He's an exceptionally academic boy anyway but yeah it's his escape (T-18-interview).

Apart from supporting communication and learning, many students spoke about how technology helped distract them as the following student pointed out: "it just keeps you occupied 'cause I know that's what I've been doing a lot" (S-7). Although this might not appear to be a direct indicator of wellbeing, one student explained that "it can, when you're not feeling the best, just to kind of calm yourself down, and just to basically look at things like that...take your mind off things" (S-14). Parents, too, noted this feature of mobile technology. One parent responded to a question about whether mobile technology helped her child's wellbeing:

Yes, because he can do whatever he wants. He watches a lot of YouTube, a lot of gag strips type things, and a lot of gaming, and YouTube...on, you know, what to do, and what not to do. And then there's where they take the mickey out of it, and they're sitting there with the headphones, giggling like a little maniac in their own little world" (P-01-interview).

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Perhaps, this power to engage and distract even from pain, is an additional affordance of social media and web 2.0 technologies to add to Merolli and colleague's (2013) list and one that has substantial support in the literature (Hamm *et al.*, 2014).

This same parent described how it helped her child's mood, "If he finds something, especially when he finds a new game, and or something that's taken his interest, like when he first started drawing [on the iPad]--it just took all his focus away from what's happening" (P01-interview). Another parent also emphasized how the connection through mobile technology helped her son's mood describing this situation:

One of the teachers texted him and actually kept in contact with him and saying, "Hey, how are you?" And that just kept him going, "Oh wow, I've got to keep on top of this, you know. Even the teacher thinks I'm special enough to talk to, and they're not supposed to do that."

Another example of technology supporting connection and this, in turn, supporting wellbeing, was described by a student who, when asked how she felt about technology, said:

A lot better in myself because I know I can talk to my friends on it, and family obviously, because my family's overseas...I've got all my Aunties messaging me ...I haven't told any of them and it's spread around because of technology...(S-5)

For one teacher working with children with mental health issues, she was particularly interested in how mobile technologies allowed her to help children create eBooks--work, they otherwise would not have completed and that they were proud of. The teacher described how it helped the wellbeing of the children:

What I do see and feel, is the pleasure that the kids get from producing something in a normal setting that they wouldn't have the patience or the concentration because their

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2
3 anxiety or academic levels are so low that they would never be in a position to produce
4 something that they're actually really proud of, and so it's more about their feelings of
5 accomplishment and self-esteem and that means I can use that when it comes to trying to
6 encourage them to do something else...(T-03-interview).
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12 This teacher described the use of the iPad as "a therapeutic tool" for these students and
13 the ways it influenced them to become re-engaged in learning and in the school environment.
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17 Another teacher reinforced this approach and noted:
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20 I work with teenagers and a lot of them aren't engaged with schools so it's just about
21 engaging the young people. I've found the most useful apps are the creative type, so
22 things like iMovie where it can help to build a relationship with the young person, find
23 out about them or tap into something that interests them (T-10-interview).
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30 In each case, the teachers discussed the importance of helping students to achieve more
31 than they are typically used to achieving, see and be proud of the product they created, have
32 reduced anxiety levels, and be ready to return to school. This was further emphasized by a
33 teacher who believed that "It's more about the therapeutic nature of what it can achieve as
34 opposed to transference of skills" (T-03-interview).
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40 41 DISCUSSION AND CONCLUSIONS

42 43 Technology and Learning

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45 Findings revealed that the affordances of mobile technology appeared to mitigate many
46 of the challenges previously found to isolate and disrupt the learning of hospitalized children.
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48 While students remarked only on mobile technology's benefits in terms of connection and its
49 capacity to distract, teachers were cognizant of and reported a much wider range of affordances.
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51 These included the affordances of identity, flexibility, structure, and narration identified by
52 Merolli *et al* (2013) as well as an additional affordance, distraction, that we identified. The
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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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3 multiple ways in which technologies may contribute to the potential improvement in academic,
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5 social, and emotional wellbeing for hospitalized adolescents appears to be related to these
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7 affordances acknowledged by teachers and, to some extent, students.
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11 Hospital school education has changed. Where hospitalized students once were
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13 disconnected from school and anxious about falling behind and missing out on schoolwork and
14
15 activities, technology has allowed their education to continue almost uninterrupted. Assignments
16
17 and resources are posted on the school portal, students can complete the same activities using the
18
19 same materials as their schoolmates with the assistance of the hospital schoolteacher, and then
20
21 submit via Dropbox to their school. Should they have questions beyond the hospital
22
23 schoolteacher's remit, they can email their teacher or even collaborate in real time with a
24
25 classmate from the enrolled school. Anxiously waiting for their schoolwork to catch up with
26
27 them at hospital is no longer the norm since liaison teachers do not have to spend as much time
28
29 connecting with the enrolled school and playing phone tag trying to locate the appropriate
30
31 teachers or resources. Waiting for materials to be mailed and then returned is also no longer
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33 required with password-protected access and prompt email responses to questions.
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39 Interestingly, the literature reports that hospitalized youth perceive their needs differently
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41 than do their schoolteachers. Adolescents in hospital placed value on their interactions with
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43 teachers, academic continuity and opportunities to learn while teachers were concerned mainly
44
45 about their health (Wilkie, 2014). This view of students was also expressed in another study by
46
47 older groups of students who wanted to stay up-to-date with schoolwork (Nisselle *et al.*, 2012).
48
49 In contrast to these findings, our study's teachers were cognizant of the pressure students placed
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51 on themselves to keep up with their schoolwork and wanted to support students to alleviate this.
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53 Furthermore, in our study, the enhanced communication evidenced through technology among
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3 all stakeholders including enrolled school staff, hospital school staff, health care providers,
4
5 students and their families has clearly changed hospital school education and challenged findings
6
7 from previous research. Hospital schoolteachers are more able to help hospitalized youth
8
9 continue with their schooling, focus on academic learning and prevent social isolation because of
10
11 the affordances provided by web 2.0 technologies (Authors, 2015).
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Technology and Connection

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16
17 A major theme that emerged was the importance vulnerable youth placed on being
18
19 connected through social media to family, friends, and school while hospitalized. Students and
20
21 mothers suggested that the feeling of not being left out and being able to interact socially was
22
23 critical to this age group. Previous research by Hopkins and colleagues (2013) supports this
24
25 finding. Interestingly access to Facebook and other social media was officially restricted for
26
27 safety reasons; therefore, outside of school hours Internet access was unavailable. But social
28
29 connection was important for these isolated students and they found creative workarounds
30
31 (Wilkie 2013). What are possible solutions to this ethical conundrum? Some teachers enabled
32
33 long-term hospitalized students to use social media (Facebook) under supervision to reduce their
34
35 isolation, and parents provided the means for this to happen outside of school hours. As noted by
36
37 Lambert and colleagues (2013) the ‘Duty of Care’ and responsibility towards patients in
38
39 children’s hospitals makes it necessary for a more customized and targeted approach. Identifying
40
41 how to establish access policies that appropriately safeguard vulnerable populations while not
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43 limiting the potential for users is difficult and concerning for both teachers and students and
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45 requires further consideration.
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Technology and Wellbeing

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3 We were primarily interested in the hospitalized students' social, psychological, and
4 educational domains of wellbeing (Moore *et al.*, 2011). In particular, we were interested in how
5 mobile technologies can help in reducing the isolation and disrupted educational experiences of
6 hospitalized students. All stakeholders identified positive aspects of mobile technologies that
7 supported wellbeing and it is evident from this study that teachers and students, to a lesser extent,
8 embraced the many affordances of technology, such as flexibility and distraction, to help
9 overcome educational disruption and social isolation caused by hospitalization.

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20 When a student was experiencing pain and educational demands, the teacher chose to use
21 the mobile device as a "therapeutic tool" to distract the student from pain during this traumatic
22 and challenging time. In a similar fashion, when students were struggling emotionally or were
23 disengaged, teachers used the devices to initiate conversations, re-engage the student in
24 something of interest to them, or create their own production in an eBook. Sometimes the
25 students self-selected the device to distract or calm themselves down. This affordance of the
26 mobile device to distract and/or engage, used by both teachers and students and reinforced by
27 parents, warrants further investigation and consideration.

38 **Limitations and Future Research**

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40
41 Accompanying the advantages of new technologies are different issues and challenges. A
42 number of important ethical issues surfaced while we conducted our research. First, the need to
43 establish online safety for adolescents in hospital should be a priority and must be addressed with
44 all stakeholders. Second, as we noted earlier, there are significant practical, ethical, and
45 methodological challenges associated with collecting data from hospitalized school children. As
46 other researchers have noted, these issues hampered the research and our ability to truly reflect
47 the children's lived experiences.

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What are the practical implications of the mobile device's use as a therapeutic tool for educators, health professionals, and researchers? Future research should identify and qualify the variety of affordances that have potential to support hospitalized adolescents and investigate the conditions under which these are most effective. While doing this research it is critical to remain mindful of the ethical challenges of conducting research with this vulnerable group. Identifying how best to support hospitalized students using mobile technology while at the same time protecting them from less positive aspects remains a challenge.

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In summary, a quote from a mother at her son's discharge from a long-term hospitalization whose words captured technology's influence on hospitalized children so poignantly:

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This has made me think how hard we try to get our kids to live *real* life when at home, but how we try to entertain them using so much of it [technology] when they are stuck in bed. How a photo on our phone or iPad can cause us to smile or have a meltdown, or even allow us to share the journey he has travelled with his surgeries to get to where he is now. It has made me think just how much we would have to carry around to do the same things if these devices had not been invented and how heavy our bags would be. How many lessons would go unlearned because the appropriate items were not available (dissect a frog) - how much less contact we would have with family and friends if we had to use only landlines and wait till we knew they were at home to answer the call?

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HOSPITALIZED ADOLESCENTS & MOBILE TECH

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4 What is currently known about the subject matter?
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- 6 • Hospitalized Adolescents feel socially disconnected and experience disrupted
7 schooling.
- 8 • This influences wellbeing and may lead to poor outcomes in life.
- 9 • Technology has been used to connect children to school, classmates and families.
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12 What their paper adds to this?
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- 14 • This paper explores the use of affordable off-the-shelf mobile technologies.
- 15 • The study examined hospitalized students, teachers and parents' perceptions.
- 16 • Mobile technologies influenced students learning, communication and wellbeing.
- 17 • Technology has changed both hospital schools and enrolled schools education.
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21 The implications of study findings for practitioners.
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- 23 • Mobile devices may serve as a therapeutic tool.
- 24 • Providing Internet access while keeping kids safe remains a challenge.
- 25 • Technology provides many features that support education in unique settings.
- 26 • Practitioners need to be aware and take advantage of these features.
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