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A Device Free Lunch Break program: An experiment to promote a balanced used of electronic devices in Middle Secondary International schools.

Research Article

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Abstract: Since the introduction of a Bring Your Own iPad scheme in the Middle Years section of a large International School, concerns have been raised from school community members regarding students' overuse of their devices, especially during lunch breaks. Hence, the device free lunch break (DFLB) programme was introduced with the aim of reinforcing existing guidance for students about achieving and maintaining a balanced approach to their use of devices. The DFLB programme was planned based on market research strategies and included all the school community members including students, parents/guardians and staff. The findings from statistical analysis of the data showed significant similarities between staff and parents/guardians' perceptions of student device use in terms of the student overuse of electronic devices. However, analysis showed that the opinions of parent/guardians and staff contrasted those expressed by students. The data also showed evidence that the introduction of the DFLB programme resulted in increased student recognition of the importance of making face-to-face social contacts with their classmates during their lunch break.

Keywords: *device balanced use, middle secondary schools, BYOD, t-paired test, mobile learning*

Introduction

The present case study aimed to provide a model for a device free lunch break (DFLB) programme that International Middle Schools can implement. This model was initiated in a large International School in the school year 2017–2018. The further adoption of such a model reinforced to students the importance of using lunch breaks to maintain a healthy and balanced lifestyle and for social contact, instead of being distracted by their electronic devices.

This type of research is not well represented in the literature. Indeed, in study of Sung, Chang and Liu (2016), which reviewed 110 papers in the literature dealing with mobile devices in teaching and learning, there are no studies on the use of devices during secondary school breaks and especially lunch breaks for those schools that offer an in-campus lunch to their students. Additionally, this paper aims to share our findings—which support those presented by Carvalho and Ferreira (2018)—in terms of the discrepancies in perceptions of the use of technology in secondary schools between students and adults (whereas in the case of the study mentioned, the perceptions studied were those of students' parents/guardians and their teachers). To our knowledge, this study is one of the first based in International Schools which involves the collection of perceptions from all sections of the school stakeholders: students, parents/guardians and staff input, and in conjunction with a strategy connected to the balanced use of students' electronic devices.

The implementation of the DFLB programme is presented based on marketing research (Garcia, 2014; Levin and Rubin, 1998). Thus, it includes a discussion

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of the statistical analysis of the data collected before the implementation of the DFLB programme and again after it. Our data were collected using pre- and post-implementation questionnaires, the results of which were used as a comparison between the two sets of data. For the statistical analysis of these results, a 'Snake map' (Garcia 2014) was employed to show the comparison between the two sets of data. We also used a *t*-paired test for the analysis of the averages of the opinions recorded in the participants' statements (Levin and Rubin 1998). The conclusions from the analysis of the data are presented in our final section.

Overall, amongst the school community, the introduction of the device free lunch has been widely viewed as positive, and the involvement of various respondent groups such as staff and students in the planning and implementation helped greatly. The students showed they understood the rationale for the DFLB programme and could see the benefits of its introduction, but were also able to assist in identifying the disadvantages. This study demonstrates that students benefit most when they are involved in decisions about managing their own device time, and programmes aiming to streamline their usage of devices help them to recognise that there are times when device usage is appropriate and times when it is not. Supporting students in this process is one of the optimal ways in which they could be empowered to harness greater possibilities of developing into well-balanced, happy and safe citizens in a digitally rich future.

These findings reinforce the importance of involving students in decisions about how and when devices should be used in schools. This observation is in accordance with Ott, Magnusson, Weilenmann and Hård af Segerstad (2018), which stresses the importance that Swedish schools place on providing clear guidance and a well-defined structure for students' use of technology, see also Retalis et al. (2018) and Kontkanen et al. (2017).

This study indicates that involving students in the process of developing *a balanced approach of the use of electronic devices will help students to avoid the negative impact of our multitasking society*, as recently presented by van der Schuur, Baumgartner, Sumter, and Valkenburg. (2015).

Literature Review

The use of computer technologies in schools has become widely established for the last 20 years, for a recent review see Sung, Chang and Liu (2016) and Kumar and Chand (2019). Most recently, the development of powerful mobile devices and fast Internet connection has resulted in what some describe as a revolution in teaching and learning (Carvalho and Ferreira, 2018; Erbes, Lesky, & Myers, 2016; Geer, White, Zeegers, Au, & Barnes, 2017; Kumar and Chand, 2018; Luo and Murray, 2018; Retalis et al., 2018; Sung, Chang, & Liu, 2016; Young, 2016). This revolution is a reference to the way in which personal technology is being integrated into schools.

It is now not uncommon for students to bring multiple personal devices into their school, even where computing devices are already made available to students by the institution. Personal mobile telephones, laptops and tablet devices are now typical items of technology in many schools around the world (Carvalho and Ferreira, 2018; Erbes, Lesky, & Myers, 2016; Kirkpatrick et al., 2018; Kontkanen et al., 2017; McCoy, 2013; 2016; Ott, Magnusson, Weilenmann, & Hård af Segerstad 2018; Young, 2016). However, some school leaders have elected to limit the use of mobile devices, (Corona Del Mar, 2018) and in other instances, devices are being banned altogether in schools (France, 2018; Greece, 2018; Joyce-Gibbons et al., 2018). Others have made it mandatory to bring them to school in order to support student learning.

Whilst the benefits of technology integration in the classroom are still being debated, few researchers could have predicted the level of concern being raised regarding overuse of the devices and the general digital well-being of users, especially school age users. Parents and educators have increasingly voiced their fears regarding the potential for device addiction and of addiction to online gaming especially. Most recently there have been growing concerns about young people's dependence on social media and on the negative effects that overuse brings to mental and emotional well-being (Langford, Narayan, & Von Glahn, 2016; McCoy, 2013; 2016; Ott, , Magnusson, Weilenmann, & Hård af Segerstad, 2018; van der Schuur, Baumgartner, Sumter, & Valkenburg 2015; Sung, Chang, & Liu, 2016).

In certain countries, such as Greece (2018), France (2018) and Tanzania (Joyce-Gibbons et al., 2018), the use of electronic devices, aside from those provided by the school and during educational time, has been prohibited. There are also International Schools where the use of devices has been banned in the school canteen, for example Corona Del Mar, a Middle School in the USA (2016). However, many International Schools have implemented a bring your own device (BYOD) policy, in order to better prepare students for a technology-rich future and to facilitate the opportunity to fully explore how the use of technology can best support learning (Langford, Narayan, & Von Glahn, 2016; Sung, Chang, & Liu, 2016).

Therefore, based on the model that was adopted in the study school beginning in the academic year 2017–2018, the present case study aimed to provide a model involving a device free lunch break, which International Middle Schools can consider implementing. This type of research is not well represented in the literature. Indeed, in the review of Sung, Chang and Liu (2016), in which 110 papers from the literature pertaining to the usage of mobile devices in teaching and learning were analysed, there are no studies on the use of devices during secondary school lunch breaks.

Methodology

The BYOD model in the current school

Three years prior to the current study, the school had introduced a 'bring your own device' programme. It was decided to mandate one type of device for all early MYP students, so that training could be best focused and planning would be easier for teachers (Erbes, Lesky, & Myers, 2016; Young 2016). Students attending years 4 and 5 do the MYP programme, and DP students were required to bring a compatible laptop device. The emphasis regarding the use of the iPads in the BYOD programme was solely on the purpose of supporting learning. Mindful of the need to provide additional support for academic staff, MYP teachers were also provided with an iPad each and in addition enrolled in training programmes to ensure familiarity with the devices, which would support the classroom learning imparted by them (Fabian, Topping, & Barron, 2018; Fenton, 2017; Howlett et al., 2019; Kontkanen et al., 2017). The BYOD programme was also supported by employing an Ed. Tech Coordinator and by providing time to personnel from each faculty in order to offer training and subject specific insight into the use of the devices in the classroom.

Despite the planning and support, the introduction of these devices in schools has resulted in numerous debates about how students can achieve a balanced approach to using their device at school, thus resulting in a healthy classroom environment that would be conducive to their optimal learning productivity, see McCoy (2013; 2016), Retalis et al, (2018), Kirkpatrick et al (2018), Langford, Narayan, and Von Glahn (2016); Howlett and Waemusa, (2019) and Fabian, Topping, and Barron (2018). These concerns led to the leadership of the school to plan the introduction of a DFLB programme in August 2017. As in the implementation of any innovative programme, there was a degree of consumer resistance, see Ram and Sheth (2015), and so it was decided to adopt a DFLB programme in order to evaluate the plan. We applied a marketing approach to introduce the DFLB programme to the various stakeholders of a school community: students, parents/guardians and staff. This managerial approach was also used in the study of teacher efficacy in private schools, see Soto and Rojas (2019).

The implementation of the DFLB Pilot programme

The implementation of the DFLB pilot programme was introduced at the start of the school year in September 2017 in the Middle Years section of a large International School. The implementation methodology that we employed was supported by a market research approach (Garcia, 2014; Levin and Rubin, 1998; Ram and Sheth, 1989), which is typically used when promoting a new product to a wide range of stakeholders. In this case, we included students, parents/guardians and teaching staff. It was hoped that by getting feedback from each of these groups, the programme could be implemented most effectively. It was decided that there would be a pilot phase of the **'product'** (the DFLB programme) lasting for 2 months. The team developed a questionnaire, and gathered the perceptions of the stakeholders (**'consumers'**, including students, staff and parents/guardians) before and after the **'pilot'** phase using the same questionnaire (a Google Form completed anonymously), which consisted of several items based on **'statements'** (see Table 1), where the perceptions of

Table 1. List of questionnaire options included in each of the pre- and post-pilot phase questionnaires sent to students, parents/guardians and teachers

If DFLB were introduced, for each of the following, please rank the importance of each activity students may choose to do on their device during break.	**Rank these benefits of having a DFLB for years 7–9 students. (Complete all rows.)**	**Rank these negative effects of having a DFLB for years 7–9 students. (Complete all rows.)**
School work	Speaking with classmates	Being bored
Games with friends	More enjoyable lunch	Not being in contact with friends online
Games on their own	More physical activity	Not keeping levels in their game
Watch video	More relaxing lunch	Only do school work in designated area
Use of social media	Better balance in device use	Not having fun playing with their devises
	Taking part in other school activities	Having more work at home
	Getting more fresh air	

the consumers for each statement were recorded using a Likert Scale of 1 (strongly against) to 5 (strongly in favour).

In order to evaluate whether or not the introduction of the DFLB programme was successful, both the pre- and post-questionnaires were made identical so that a comparison of the responses would provide evidence of any impact the implementation of the pilot might have had upon the opinions of the various stakeholder groups. The average values for individual statements were collected from each questionnaire before and after the pilot phase. The questionnaires also included open-ended questions to ensure that recipients had the opportunity to provide additional ideas and suggestions for the DFLB programme.

The questionnaire was divided into three main categories that are summarised in Table 1. In the first category, we had identified a number of activities that the students engaged in during lunch using their mobile devices such as smartphones, tablets or laptops. Those activities are: school work, games with friends or on their own, watching videos and using social media. In the second category, we considered the potential benefits to the students that are expected to arise from having a device free lunch, such as: to speak with classmates, more enjoyable lunch, physical activity, relaxing lunch, better balance in device use, taking part in other activities or just be outside on the fresh air. Finally, the questionnaire included items on possible negative effects that students having a device free lunch may have to be face, such as: being bored, not keeping in contact with friends online, not keeping levels in games, not having fun playing with devices and only doing school work in designated areas. The restriction of device use during lunch break was especially important to the students who recognised that since the implementation of the BYOD programme in the school there had been an increase in the need for students to complete digital elements of work, usually on their iPads. Therefore, the students would often use their iPad to complete their class work and additional home-learning tasks.

Data collection via questionnaires before and after the implementation of the DFLB pilot programme

At the time of the study, during the school year 2017–2018, there were approximately 1,200 students, 180 secondary teachers and 450 families. In this study, only stakeholders connected with the specific year groups were provided with questionnaires that were 545, and their 450 families. The students bring their own iPad, and each staff member who is teaching in their class has an iPad supplied by the school institution. Students forming part of our school community hail from more than 100 different nationalities. The majority of our students were familiar with the use of an iPad in lessons before joining the school.

The student respondents completed the online Google form under staff supervision during mentor periods at school. Technical issues did prevent some students from completing the form. Teaching staff received the Google form via their school email. Support staff were not included as respondents in this study. The Google form questionnaire was also sent to the main email addresses of the respective families of the relevant students, assuming that only one family member might be expected to answer it.

The numbers and response rates before and after the pilot phase of the DFL project were as follows: Students 545: 455 (84%) before and 465 (85%) after; staff 180: 100 (55%) before and 75 (42%) after; parents/guardians: 450: 221 (49%) before and 175 (35%) after.

It was evident from the overwhelmingly positive responses to the open-ended part of the questionnaire from parents/guardians and staff that the introduction of a pilot test of the DFLB programme was widely welcomed. The introduction of the DFLB programme was also widely supported by students.

Proposed model of implementation

Before the implementation of the pilot phase of the DFLB pilot programme, the following steps, presented in Tables 2–4, were followed. These steps are our contribution towards other International School teams who might be interested in establishing their own DFLB programmes.

(a) A description of the programme, see Table 2, and a policy**,** see Table 3, were communicated to students and staff.

(b) Visual reminders in the form of posters and banners were designed and displayed in prominent locations all around the school canteen areas to promote the implementation of the DFLB programme.

(c) The identification of designated, supervised areas in the school building that were allocated for the students to do school work during lunch break.

d) The identification and promotion of alternative activities for the students to perform during their lunch breaks, see Table 4.

These steps contributed to the efficient running of the pilot phase of the DFLB programme, which ran smoothly for 2 months with no disciplinary issues arising.

Table 2. The description and the pilot phase of the DFLB pilot programme

Description of the DFLB programme
1. The duration of the programme.
2. The students will not be allowed to use any device during lunch break.
3. The creation of designated areas where the students can use their electronic devices for doing their homework.
4. The use of visual posters to indicate (i) the study areas where students can use the devices to do school work, and (ii) the school areas where students would not be allowed to use them.

DFLB, device free lunch break.

Table 3. The policy document of the DFLB programme

Disciplinary steps in the case of the use of devices during lunch break.
Step 1: Teacher reminds student in a gentle way of the DFLB rule and if possible, points at one of the 'DFLB' posters located around the school premises.
Step 2: If the student doesn't respond and refuses to stop using the device the teacher asks the name/year and sends an email to a YL, a senior member of the school management responsible for a school year.
Step 3: YL forwards email to the relevant mentor, who talks to the student.
Step 4: If the YL is notified for the third time about the same student, the YL sends a standard email home with cc mentor.
Step 5: If, after this, the student is still on the device, the student will be signed up for an in-school detention.
Step 6: If, after the in-school detention, the student continues to be on his/her device, the student will receive an escalated, YL-detention.

DFLB, device free lunch break; YL, year leader.

Table 4. Alternative activities to the use of the electronic devices during DFLB pilot programme

Board games Available in various locations	PHE equipment Sport games offered at gyms	Reading books Library corner	Clubs Offered by various subjects

DFLB, device free lunch break.

Thus, the programme designed by us is also a contribution in this direction that can benefit International Schools aiming to implement a DFLB programme.

Results

Descriptive analysis of the results of the questionnaires

The methodology that was adopted for a statistical analysis of the results involved two tools used in marketing research: the 'snake map' (Garcia, 2014) seen in Figure 1 and a paired *t*-test at a level of significance of 5% **(**Table 5**)** (Levin and Rubin, 1998).

Figure 1 presents a comparison of the average values for staff, parents/guardians and students before and after the pilot phase of the DFLB programme. In the first column, the various statements included in the Likert items from the questionnaire are shown. In columns 2, 3 and 4 are the results for parents and guardians, teaching staff and students, respectively. The responses from before the DFLB programme are plotted with a blue line whilst the responses collected after the implementation of the DFLB programme are plotted with a red line. These graphs represent the average values for opinions of each stakeholder group before and after the pilot phase of the DFLB programme. The questionnaire explored three areas of interest. First, the perceived importance of how devices were used during lunch time; second, the potential benefits that introducing a device free lunch would provide; and third, the potential negative effects of introducing a DFLB programme.

Hypothesis testing statistical analysis of the questionnaire results

Table 5 shows the results of a statistical exploration of the effects of the pilot phase of the DFLB programme on the opinions of the staff, parents/guardians and students by using a paired *t*-test at a level of significance of 5% (Levin and Rubin, 1998). It can be seen that the pilot phase of the DFLB programme did not have any statistically significant impact on the responses of each group of respondents obtained before and after the pilot phase was implemented. In other words, the pilot phase of the programme had no influence upon the nature of the responses of each group in the initial and follow up surveys. This finding may be due to the relatively short

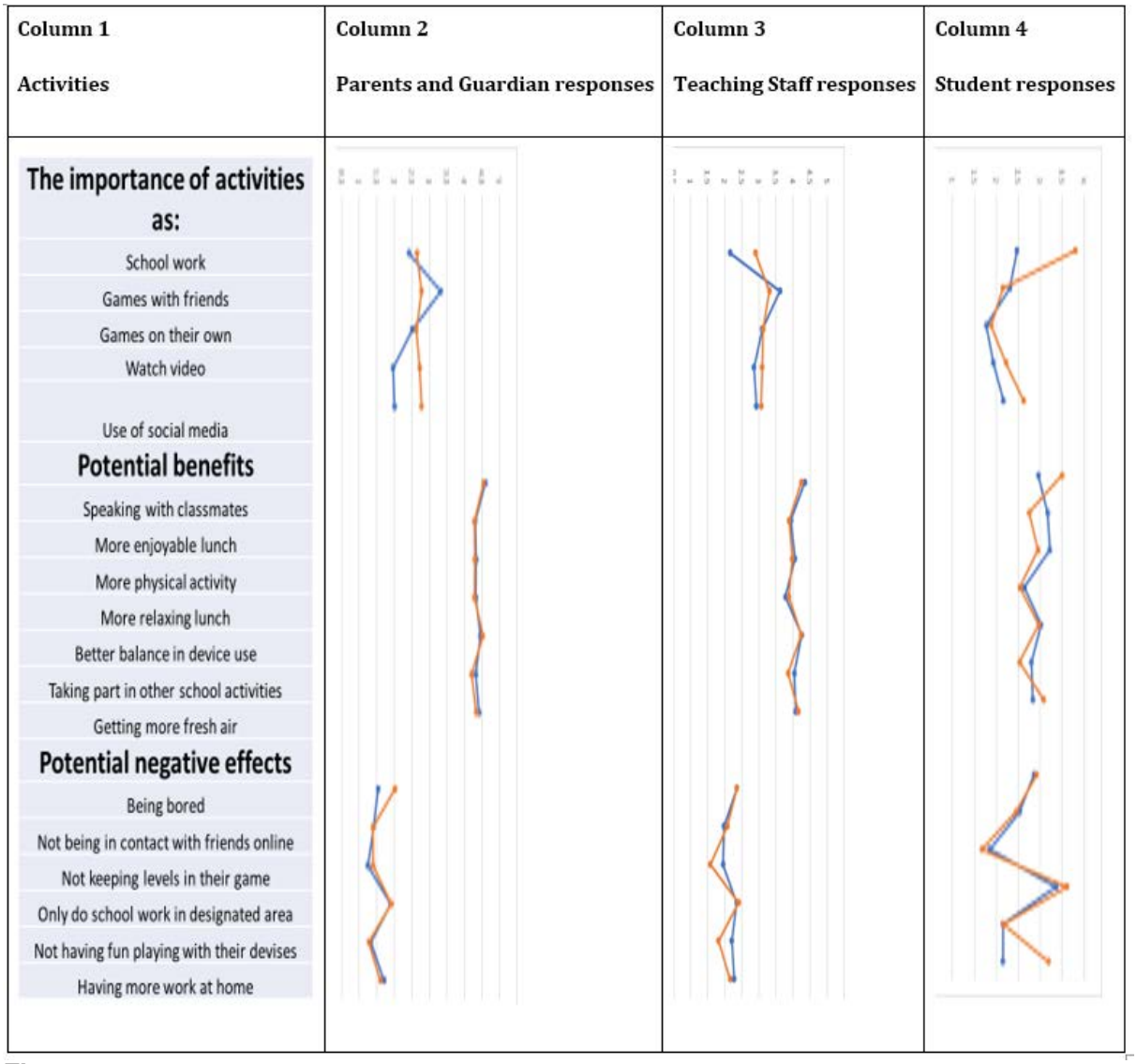


Figure 1. A comparison of averages for the answers provided by parents/guardians, teaching staff and students before (blue line) and after (red line) the introduction of DFLB pilot programme.

Table 5. The *t*-paired test for the stakeholder opinions before and after the DFLB programme

	Mean before	Mean after	Standard deviation before	Standard deviation after	P-value	Conclusion
Staff	4.2	4.39	1.287	1.053	0.254	No impact
Parents/guardians	4.82	4.85	0.593	4.85	0.704	No impact
Students	2.74	2.75	1.228	1.234	0.9541	No impact

DFLB, device free lunch break.

Table 6. Findings that show significant variation due to the introduction of the DFLB programme

	Staff	Parents/guardians	Students
The importance of activities:	*School work*	*Games with friends* *Watch video* *Use of social media*	*School work*
Potential benefits			*Speaking with classmates*
Potential negative effects	*Being bored*	*Not keeping levels in their game* *Not having fun playing with their devices*	

DFLB, device free lunch break.

duration of the pilot phase of the DFLB programme, which was too short to result in significant change of the opinions of each of the respondent groups.

Table 6 shows the instances where the *t*-paired test showed a significant change for each of the three stakeholders in responses gathered before and after the pilot phase of the DFLB programme. These differences were evident in each of the questionnaire sections but varied between the respondent groups.

Discussion

Importance of device activities

The results presented in Figure 1 from parents and guardians show the differences in the perceived importance of the use of the electronic devices before and after the pilot phase. Column 2 shows that, among parents, these differences were particularly evident in relation to the use of devices for gaming with friends, watching videos and using social media. Column 3 shows that among teachers, it was identified that using the device for school work would be an important activity for the students, and that the post introduction questionnaire showed this type of activity was perceived as important by a larger group of respondents. In Column 4, student responses also showed an increase in the opinion that the use of the iPad for school work was important.

The snake map indicates that the parents and guardians perceive the iPad as mainly a device the students use for leisure activities such as watching videos or using social media, and that that perception had increased in importance after the introduction of the DFLB. It is interesting that these perceptions contrasted with those of the students and teachers, for whom the perceived importance of iPad use was more focused upon using the iPad in supporting school work. However, the graphs show that there are few changes in the perceived positive or negative effects of the DFLB programme before and after the pilot phase. The perceptions of teaching staff respondents were not shown to be influenced by the pilot phase of the DFLB programme. For the students, there are changes in terms of the impact upon school work (not enough time to do them) and upon face-to-face social contacts (more time to have social contacts) as a result of the introduction of the pilot phase of the DFLB programme. These findings align with those presented by Carvalho and Ferreira (2015), in terms of the discrepancies between the perceptions of the use of technology in secondary schools among students and adults (whereas in our case, similar discrepancies were observed between the opinions of students' parents/guardians and their teachers).

The visual analysis of Figure 1 is supported here by statistical analysis of the results, which shows, in each case, that where a visual difference was evident there a statistically significant variation was also evident. We can be more confident, then, in asserting that the implementation of the DFLB programme resulted in differences between groups with regard to the effect on the opinions of each respondent group. Table 6 shows that teachers and students identified the importance of the iPad as a tool for doing their school work (Erbes, Lesky, & Myers, 2016; Howlett and Waemusa, 2019; Retalis et al., 2018) whilst parents and guardians identified the iPad as a device used mainly to play games and watch videos and for social media. This result indicates the parental misconception that the device is only used for social or leisure pursuits. Actually, the device is a tool which supports the learning of the students, and the teachers and students recognised that the introduction of a DFLB programme reduces student access to that important learning tool. It also highlighted that for many students, the lunch break is an additional opportunity to catch-up on classroom or home-learning activities.

Potential benefits of a DFLB programme

With regard to the potential benefits of the introduction of the DFLB programme, in Figure 1, Columns 2 and 3 show negligible differences in the opinions of parents

and guardians and teacher respondents before and after the DFLB programme implementation. However, Column 3 shows that among students there were observable differences in the potential benefit of a device free lunch in terms of an increased opportunity to speak with classmates. The authors were pleased that the students recognised this enhanced opportunity that the implementation of a device free lunch would provide, and further analysis showed that there was a statistical significance to this variance. This finding reinforces the importance for students to have a balanced approach in their school days when they are potentially exposed to various multitasking activities with associated negative effects, as presented by van der Schuur, Baumgartner, Sumter and Valkenburg (2016).

Table 6 indicates that among the students, another potential benefit of the introduction of the DFLB programme was the opportunity to engage more in face-to-face conversations with other students. This is an activity that the school has emphasised with the students since the introduction of the BYOD iPad programme, as it is considered by the school community to be part of a healthy and balanced approach to the use of technology. It is a very positive outcome that students recognise the introduction of the DFLB programme as an opportunity for these face-to-face interactions to occur. In terms of the potentially negative consequences of the DFLB programme, the teaching staff worried that the students might become bored. The results from the surveys support further the discrepancies observed between adult and student perceptions of the role of digital technology at school (Flanigan and Babchuk, 2015) Indeed, the staff considered that the introduction of the DFLB programme would merely result in the student not maintaining levels in their games or having less fun with their devices.

Potential negative effects of a DFLB programme

Parent and guardian opinions of the potential negative effects of the implementation of the DFLB programme remained relatively unchanged before and after the DFLB programme implementation. There is a slight increase in the perceived chance of boredom among the students once the iPads were no longer available during their lunch break. Among teacher respondents, we see a change in the items relating to 'not keeping levels in their game' and 'not having fun playing with their devices'. The students, however, were more focused upon the negative effect of having more work to do at home as the DFLB programme displaced this activity from school. As a result of this feedback, the students were provided with additional spaces in school where the use of the device is permitted for doing school work.

From these observable differences it can be seen that the various respondent groups had very different perceptions of the way in which iPads were being used at school and about the potential effects that the introduction of a DFLB programme would have. Parents and guardians focused upon the use of the device as a tool for gaming, watching videos and using social networking, and largely harboured the opinion that the introduction of a DFLB programme would lead to boredom among the students. Teachers and student respondents were more focused upon the use of the device as a tool for school work, with the potential negative effect highlighted by this category of respondents being that students would have less time at school to engage with school work. While parents and guardians identified boredom as a result of introducing the DFLB programme, students recognised that the DFLB programme would provide them with more time to talk to their friends.

Limitations and further implementations

Based on the overall analysis of the pilot phase of the DFLB programme, the school management made the decision to continue the DFLB programme till the end of the school year 2017–2018; and since then, it has been adopted as a permanent element at school. From this study, we learned that the students provided a useful, balanced and positive view of device use at school. This was contrasted by the perception of parent respondents, who tended to be less positive about the use of the devices and how they are used. This negative view may serve as one of the influencing factors in a school management's decision in determining how the devices should be managed within the school.

The approach to the introduction of a DFLB described here applies a market research approach in which views from a wide range of 'consumers' were collected. The approach has helped to reinforce a positive view of the benefits of technology in learning, and has explained how technology can continue to have a positive impact on the ways in which students learn, as pointed out by Langford, Narayan, and Von Glahn (2016), Flannigan et al. (2015) and Howlett and Waemusa (2019).

The limitation of this case study is that the data are based almost entirely on collecting stakeholder perceptions of the benefits and detriments of technology use in a school. The qualitative data could be further supported by quantitative data gained perhaps as and how the students used their devices. Although this approach was considered, it was decided that the ethical consequence resulting from monitoring the use of a device owned by the students was too great. Even if electronic monitoring of device use was

desirable, it would not be easy to test the reliability of the measurements, especially during use outside of school. The authors consider that it would be useful to extend this line of study in future researches by introducing a device free approach to other school breaks or even extending it to students of the Junior and Senior years.

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