When Teaching Practices Meet Tablets' Affordances. Insights on the Materiality of Learning

Jalal Nouri(✉) and Teresa Cerratto Pargman

Computer and Systems Sciences, Stockholm University, Stockholm, Sweden
jalal.tessy@dsv.su.se

Abstract. Research on tablets in schools is currently dominated by the effects these devices have on our children's learning. Little has yet been said about how these devices contribute and participate in established school practices. This study delves into the questions of what do tablet-mediated teaching practices look like in Swedish schools and how are these practices valued by teachers? We collected data in four Swedish schools that were part of the one-to-one program financed by their municipalities. We apply qualitative and quantitative analysis methods on 22 deep interviews, 20 classrooms observations and 30 teachers' responses to an online survey. The study identifies a set of tablet-mediated teaching practices that lead to a deeper understanding of how affordances of media tablets configure contemporary forms of learning.

Keywords: Tablets · Affordances · Teaching practices · Mobile learning · Materiality of learning

1 Introduction

Mainstream research on mobile technology and media tablets in the area of education has so far focused on the implications of using mobile devices in formal learning activities [1, 2]. Roschelle et al. [3], and Chou, Block and Jesness, [4], have for example, reported on a correlation between use of mobile devices and enhancement of student engagement as well as progress of students' achievement. Other scholars in the field have underscored the proliferation of learning activities including interactive content creation [5]. Moreover, the open and easy access to information afforded by mobile devices while sitting in the classroom [6] as well as support for user-generated contexts [7] seem to modify power relations between teachers and students [8] and to have an impact on learners' shared epistemic agency [9]. Further, studies also point to the potential role of mobile technology to foster students' creativity and collaboration [10]. These studies have much contributed to understanding the value of using media tablets in teaching activities, however, most of them have approached media tablets and their affordances [11] as disembodied from their everyday use [9]. As such these studies have overlooked aspects associated to emerging teaching designs [12] and teaching practices [5]. Still underexplored is how tablet-mediated school practices emerge in the classroom as well as how they bring in new aspects that contribute to the

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quality and meaningfulness of students' learning [13]. Taking a mediated action lens on technology affordances, [11], the paper presents a study we conducted in four Swedish schools which have been part of a 1:1 (one-to-one program) since 2012. The aim of the study was to understand what tablet-mediated teaching practices look like and how teachers value them. A mediated action perspective [11] is here chosen because it provides us with tools to look at the material characteristics of technology, in this particular case, media tablets. These material characteristics of technology thereafter called affordances are understood as a relational property of a three-way interaction between the person, mediational means, and cultural environment [6, 11]. Such conceptualization differs from others [14] as it situates affordances within a socio-cultural milieu and it emphasizes the dynamic and situatedness of the concept.

The present study delves into the materiality of the school activities identifying a set of tablet-mediated teaching practices that are entangled to the following affordances: persistence of the digital medium, multimodal character of the content of the applications and portability & ubiquity of media tablets. These material characteristics of the tablets afford a series of teaching and learning activities, we contend, play a central role in configuring the school practices observed in the study. As such, the study contributes to a deeper understanding of the weight that the specific design of tablets has on everyday teaching activities and practices. The paper also contributes to furthering current understanding of how media tablets, regarded as sociocultural artefacts, participate and configure contemporary forms of learning.

2 Description of the Methods and Context of the Study Chosen

2.1 Schools and School Subjects Targeted

We selected four Swedish elementary schools to conduct a study on emergent practices and transformations tied to the use of tablets in school classrooms. The schools selected obtained the tablets 3 years before we started our study in December 2013. Since then, we observed how and for which purposes the teachers had incorporated tablets in their teaching. These schools took part of the 1:1 tablet program providing students from 3rd grade to 9th grade with individual tablets (i.e. ipads). Two of the selected schools were public schools in the Stockholm area. They were chosen to participate in the program as they are considered "special schools" due to the heterogeneity of pupils' socio-economic, cultural backgrounds and languages proficiencies. The other two schools were located in Växjö, south of Sweden, and were private schools and comparatively more homogenous that the schools in Stockholm, at least in terms of pupils' socio-economic, cultural backgrounds and languages. The schools had in common a type of organization consisting among others of a dedicated leading group of teachers and IT pedagogues mainly responsible for spreading the use of tablets among teaching staff. As such, all the schools observed selected a group of teachers (10 % of the total amount of teachers in the school) to lead the introduction of the tablets in the classrooms through the following activities: (1) organizing workshops with the staff where learning platforms and main apps were demonstrated, (2) strategizing the introduction

of the use of the media tablet into all school subjects, (3) discussing gained experiences with specific apps (4) choosing useful apps to purchase collectively. As such a dedicated group was actively leading the integration of the tablets in each of the schools studied schools.

The study focused specifically on the subjects of Natural Sciences and Mathematics as well as English and Swedish in grades 6–8 (age range 11–14 years old). We started to visit the schools in December 2013 and finished the data collection in December 2015.

2.2 Data Collection Methods

We conducted 22 deep interviews with school teachers (i.e., 60 min each), we observed 20 classrooms (i.e., 45 min each) and we collected 30 teachers' responses to an online survey. The teachers in the sample (n=30), consist of a rather experienced group of teachers, as they have taught for an average of 14 years (SD=10.11). The teachers interviewed were actively using the media tablets in their classrooms since the school became part of the 1:1 program in 2011.

The *interviews* of semi-structure nature were conducted at the schools. They consisted of questions covering four areas: 1- demographic questions (age, years of private tablet use, years of teaching, etc.) 2- questions about how teachers use tablets and how tablets support teaching, 3- questions about how pupils, according to the teachers, use tablets and are a support for learning, 4- questions about teachers' perceptions of benefits and disadvantages of using tablet in the classroom. A tape-recorder was used when conducting the interviews. The interviews were all conducted in Swedish.

Data were also collected through *field notes, photos and video-recorded events*. The school subject of the classrooms observed were: Natural sciences (chemistry and biology), Mathematics, English and Swedish. Both authors participated in the classrooms observations. We wrote notes, took photos (with the aim to provide a context to our notes and help us remember afterwards the classrooms observed), we also video-recorded when possible. The foci of the observations were: (1) type of activities conducted with and without the tablets, (2) tools (analog or digital- inclusively apps) employed; and specifically their main affordances and (3) observed tensions within teacher-tablet-pupil interactions.

With the purpose to examine how teachers perceived the value of and the relations between the thematic practices identified, we constructed a survey. The survey was sent to the participating teachers in the study. It consisted of 8 scales with a total of 53 items (see Table 1).

An exploratory factor analysis with principal component extraction was performed in an attempt to refine the instrument. After factor analysis, 12 items that did not load on any factors or were highly cross-loaded on multiple factors, were removed. Accordingly, the refined instrument used for analysis consisted of a total of 41 items. Overall, Cronbach's alphas were calculated for scales 2-8 with values ranging from 0.69 to 0.84. The survey was developed and administered through a web tool.

Table 1. Overview of the survey.

Scale	Items	Focus
1	22	Demographic questions and general attitudes and perceptions of using tablets for teaching and learning
2	5	Teacher's perceptions of the benefit and frequency of using tablets for increasing student motivation and engagement
3	4	Teacher's perceptions of the benefit and frequency of using tablets for organizing learning
4	7	Teacher's perceptions of the benefit and frequency of using tablets for multimodal teaching and learning
5	4	Teacher's perceptions of the benefit and frequency of using tablets for documenting learning
6	4	Teacher's perceptions of the benefit and frequency of using tablets for assessing and providing feedback
7	4	Teacher's perceptions of the benefit and frequency of using tablets for communicating
8	3	Teacher's perceptions of the benefit and frequency of using tablets for distributing learning

2.3 Data Analysis Methods

The interviews were fully transcribed and together with the field notes, photos and video-recordings from the classroom observations, were first independently coded and then collaboratively re-coded by both authors. We used procedures from content analysis [15] that supported the identification of conceptual threads from the text corpus obtained. The aim of our coding was the identification of tablet-mediated teaching practices. The content analysis resulted in the identification of a total of 7 themes corresponding to tablet-mediated teaching practices and a total of 25 specific categories of tablet-mediated pedagogical practices. The themes identified are: (1) organization of teaching and learning material; (2) documentation; (3) multimodal teaching and learning; (4) motivating pupils' engagement; (5) assessment and provision of formative feedback: (6) e-mail communication and (7) mobile learning.

3 Findings

This section reports on results from both qualitative and quantitative analysis performed on the interviews, field notes and the survey. The section introduces first, the 7 tablet-mediated teaching practices identified. That is followed by a presentation of the relation between teaching practice identified and teacher's perceptions of the value of using tablets in the classroom.

3.1 Tablet-Mediated Teaching Practices

The content analysis of 20 classroom field notes and 22 interviews with the teachers resulted into the identification of the seven thematic tablet-mediated pedagogical practices with associated categories of practices. See Table 2 for an overview of the identified thematic and category of practices. The table also displays the device's affordances we observed were associated to the practices identified.

Table 2. Overview of the tablet-mediated teaching practices in the schools studied

Thematic Practice	Categories of practice	Tablet affordance
Organizing teaching and learning	Centralizing and sharing instructions, learning material and assignments	Persistence of the digital medium
Documentation	Supporting self- reflection, Supporting metacognition Providing individualized learning, Increasing access parental insight	Multimodal channels Persistence of the digital medium
Multimodal teaching and learning	Multimodal presentation of teaching and learning material, Self-construction of teaching and learning material, Re-using learning material from the Internet, Representing and visualizing facts, Supporting language learning (pronunciation through sound and comprehension through videos). Tackling reading and writing difficulties	Multimodal channels: sound, image, text
Motivation and engagement	Game-based learning and individualization	Multimodal channels Portability of the mobile device
Assessment and provision of feedback	Collaborative assessment/feedback, Individual assessment/feedback, Class assessment/feedback, Automatic assessment/feedback	Multimodal channels Persistence of the digital medium
E-mail communication	Teacher – Student	Persistence of the digital medium
Mobile learning	Flexibility and mobility	Portability and ubiquity of the mobile device

Each of the practices identified were incorporated into the survey. We sent out the survey with the purpose to find out how teachers value such practices in terms of (1) use frequency of the tablet and (2) perceived usefulness in the classroom. See results in Table 3.

The teaching practice called organization of teaching and learning material dominated as the most valued tablet-mediated teaching practice followed by documentation and multimodal teaching and learning. Practices oriented to using the tablet for

Table 3. Overview of the tablet mediated practices in relation to how teachers valued each of them in their teaching.

Practices and activities	Valued theme[a]
Organizing teaching and learning	M = 6.31, SD = 1.94
Documentation	M = 5.56, SD = 1.92
Multimodal teaching and learning	M = 5.17, SD = 1.93
Motivation and engagement	M = 4.56, SD = 1.87
Assessment and provision of feedback	M = 4.44, SD = 1.94
E-mail communication	M = 2.44, SD = 1.76
Mobile learning	M = 2.42, SD = 1.93

[a]Valued theme represents composite variables measuring how frequent and how useful thematic practices are on a scale from 1 to 8 according to the teachers.

motivating children and, as a support for assessing children's progress as well as for providing feedback, were also mentioned. Finally, using the tablet for e-mail communication and mobile learning were the least valued practices. In order to give the reader a sense of the tablet-mediated teaching practices identified, we describe each of them in detail in the following sections.

Organization of Teaching and Learning. From the analysis of the data, it Emerges that this practice is tightly related to the use of the learning management system (LMS) teachers use daily at the school. Specifically developed for tablets, LMS such as Schoolsoft, Learnify, I Tunes U, were daily used in the schools studied for creating and organizing learning material. In particular, the teachers we observed mentioned in the interviews the creation of instructions for individual assignments and group activities. Teachers explained to us they asked pupils to submit their assignments through the system so they can provide individual feedback that is then saved in the system for future consultation. Teachers also mentioned that material such as grading criteria, tests, homework, were uploaded and made available in the LMS facilitating centralization and distribution of learning material for the pupils. One of the teachers mentioned: *"Instead of handing out 300 papers every week, I have chosen to make all course material available in the system. I have uploaded instruction films, assessment material, homework, exams, everything. So, instead of referring to lost papers, I refer students to their tablets"* (Steve, natural science, Stockholm).

Documentation. Using tablets for documentation purposes was the second most valued thematic practice according to the teachers (M = 5.56, SD = 1.92). This practices involved for instance supporting self-reflection. In one of the class observations, we for example noted that students documented their lab work in chemistry with their tablets in form of text, tables and photos taken with the camera, that were then uploaded to the LMS system. The material available in the LMS was then commented by the teacher (after the activity), and collectively analysed by the entire classroom in a subsequent activity the next day. One of the teachers mentioned: *"the work students upload to the learning management system through their tablets is revisited for repetition and further analysis"* (Laura, Swedish, Stockholm).

Another aspect that the documentation practice supported was pupils' meta-cognition, in the sense, children were encouraged to create digital portfolios consisting of presentations combining text, images and audio. In the Swedish class, digital portfolios were then used by pupils to revisit words forms, adjectives, and idiomatic expressions and to stimulate pupils to reflect over their own learning progression. One of the teachers interviewed mentioned: *"I use digital portfolios that enable them [pupils] to monitor their own learning and compare their own performances"*. (Martha, Swedish, Växjö).

Through the multimodality afforded by tablets' numerous apps, these devices facilitate teachers create digital portfolios and e-books. These portfolios and e-books support among others communication with parents who are interested in knowing what their children do at school.

Mobile Learning. Another way to organize teaching that was mentioned by the teachers was related to portability and ubiquity of the tablet. In this regard, we observed tablets facilitated allocating tasks to groups working in different rooms. Usually the stronger pupils, worked outside of the classroom while the teacher focused on the students with special needs inside the classroom. This was possible due to the fact that the information about the assignment was not only both displayed on the classroom whiteboard but also available on each children's tablets. Considering tablets' portability, one would expect that such affordance is often used to support mobile learning activities. In this study, we did surprisingly not found mobile learning activities were frequent or considered beneficial for learning (M = 2.42, SD = 1.93). However, the portability and ubiquity of the devices were mentioned as facilitating continuity of school activities, especially when pupils miss assignments due to absence or other. One of the teachers mentioned: *"It [mobile learning]helps when students are not here, if they are sick for instance, they can work on the same things as we do in the class from home. That helps us to reach the course objectives."* (Morten, English, Växjö).

Multimodal Teaching and Learning. rom the data analysed, it emerged that a large number of categories of practices was associated to the utilization of multimodal affordances of the tablets (i.e., sound, image, text). Using the tablet in the classroom was perceived by the teachers as a frequent and beneficial (M = 5.17, SD = 1.93) manner to teach as tablets by their affordances invite teachers to include multimodality in their teaching. Multimodal ways to teach and learn were exemplified by "presentations" pupils constructed using diverse applications for saving and managing photos, sound, video and text. Another central category of this practice was the creation of learning material such as: storytelling, e- books, portfolios, e-posters, movies, animations, interactive drawings made by the pupils. In the following excerpt, a teacher exemplifies one such emergent multimodal construction practice: *"They [pupils] looked at a video that is called "what does the fox say". Then they got the assignment to construct an own version of the video, and that can be done in different ways, they can for example sing, record themselves, record others, and then play it for the class in case they don't dare to stand in front of the class ... the tablet allows me to offer the students more ways to learn in the same classroom. It is not the case that all have to write texts"* (Lisa, English teacher, Stockholm). This example, illustrates the use of media tablets for practicing English while developing skills for expressing meaning

beyond the text mode. Besides construction, it was revealed that media tablets frequently were used to find, consult and eventually reuse multimodal learning material available on the Internet. Using Internet in the classroom was especially appreciated as teachers mentioned, Internet extends the knowledge sources used in schools and the possibilities to present knowledge through different modalities. *"instead of as we did before telling the students to look it up in the book, we tell them to find the information on the internet in form of videos, images or texts"*. (Petter, mathematics, Stockholm).

Teachers specifically mentioned the fascination pupils have for the image, which they believe helps pupils, especially those presenting weak language comprehension abilities in Swedish or English, with meaning-making processes. However, teachers also mentioned that the emotional relation pupils develop with the image motivated teachers to think seriously about how teach pupils to critically think about material and sources they find on the Internet or elsewhere. One activity that supports this goal is for instance the one implemented in the chemistry class where students were asked to take photos and make short films on the process of acidification. Once in the classroom, pupils were listening and discussing the information pupils provided through the films (containing children's own definitions of acidification process) and analysing the sources consulted and the accuracy of the content shared, with the purpose to find scientific indicators of acidification. (see Fig. 1).

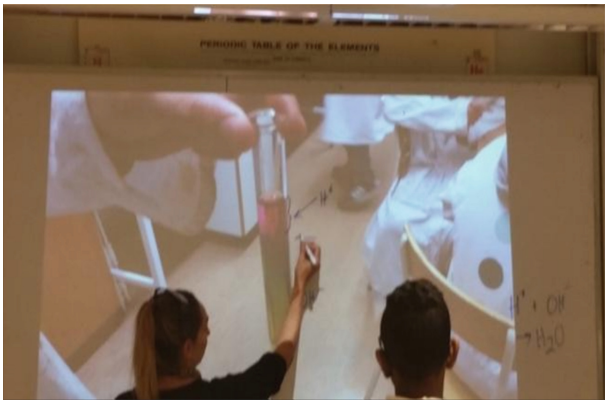

Fig. 1. Teachers and students analyzing results

Another category within the multimodal teaching and learning practice was language learning, facilitated by apps that were used to support pupils' pronunciation, vocabulary building, reading comprehension, spelling, and grammar in both Swedish and English. Most of these apps are indeed educational games. Several teachers valued particularly these educational games for children with other mother tongue than Swedish and for those diagnosed with dyslexia. According to the teachers a great majority of these games helped children to follow the teacher at almost the same pace than the rest of the class.

Motivating Students' Engagement. According to the teachers using tablets in the classroom seem to increase students' motivation and engagement. For instance,

one teacher mentioned: *"We know that Ipads increases students' motivation, so when I feel that I need to increase students' engagement I let them work on the Ipads. That does not mean that I let them play games on the Ipads, they do serious work." (Sanna, Swedish and English teacher, Stockholm).* The teacher made reference to training language vocabulary and spelling activities given for instance on Fridays afternoon. At this particular time of the week, pupils are often tired and unfocused so the use of games for language training helps the class to engage with learning of vocabulary, spelling and pronunciation. In one opportunity, we observed how the entire classroom in the English class competed in groups performing tasks demanding vocabulary, pronunciation and spelling abilities. Children became extremely excited visualizing the scores and negotiating answers based on their language skills. In another opportunity we observed teachers in mathematics to use educational games in the classroom to train the class about arithmetic and geometry as well as identify which concepts needed to be reviewed; as the game makes available pupils' individual and group scores to teachers. As such games were used to get information on which pupils had more difficulties with a particular concept and test the overall class of most frequent errors. We also noticed, educational games were used to support collaborative learning through the resolution of for instance mathematical puzzles.

Multimodal educational games were also used in natural science. They often focused on multiple-choice questions and quizzes that pupils answered individually, or in dyads sharing a tablet. One of the teachers mentioned the value of these emergent practices in the classroom, stating: *"It is a fantastic activity. The students sometimes can't sit still and are jumping around because they are eager to know what the correct answers are."* Teachers in this study also mentioned they regarded educational games as a motivating tool challenging children to progress, visualize their own progression and work at their own pace, both in school and beyond.

(Formative) Assessment and Provision of Feedback. According to the teachers participating in our study, the integration of tablets in the classroom provided them with possibilities to systematically assess students and provide more accurate individual feedback on pupils' assignments. Teachers distinguished four categories of assessments and feedback practices, namely: (1) group assessment/feedback, (2) pupil assessment/feedback, (3) class assessment/feedback, and (4) automatic assessment/feedback. For instance, group work was assessed in different ways through the use of media tablets. One of the teachers of English let pupils video record their group conversations which later were assessed by the teacher who provided individual feedback to each group. That particular teacher emphasized the advantage of assessing video recordings of group discussions and conversations in the following way: *"By using video recordings I have documented what I base my assessment on. It allows me to forward and rewind. That is not possible when I observe a live discussion."* (Sanna, Swedish, English, Stockholm). The digital medium makes a difference for the teachers who can systematically save and retrieve, in this case group assignments and provide a more grounded feedback to the pupils. It is even the case teachers can show the recording to the pupils and engage a conversation on pupil's performance and teachers' assessment with the pupils. Another example was the one about assessing the whole class and providing feedback to the pupils that was facilitated by games application

such as Kahoot. This application, we observed, enabled teachers to monitor both the progress of the class and each pupil individually and thus the possibility for teachers to provide feedback accordingly. The use of the digital material facilitated teachers to revisit pupils' performance and to adjust assessment and feedback provided, based on the evidence saved (i.e. audio files with pupil's conversations, pupil's reading of a text). In this case, the multimodality characteristic of the media tablets used for recording group or individual performance contributed to a more accurate assessment. The multimodality and persistence of the medium made of assessment and provision of feedback an evidence-based practice.

E-mail Communication. The analysis of the data showed that teachers do not really use tablets for communicating with the pupils through for instance e-mail. (M = 2.44, SD = 1.76). Teachers communicate with pupils face-to-face or mainly through instructions, assignments or feedback teachers provide on pupils' tasks available in the LMS.

3.2 Relation Between Identified Practices, Teachers' Perception of the Value of the Tablets in the Classroom and Transformation of Established School Practices

The results issued from the quantitative analysis revealed that teachers in general valued positively tablets in their teaching (M = 6.23, SD = 1.45) as they underscored tablets integrated in everyday pedagogical activities facilitate pupils to engage with school tasks and assignments (M = 6.14, SD = 0.36), motivate pupils (M = 6.31, SD = 1.52), and improve pupils' school performance (M = 5.72, SD = 1.93). The quantitative analysis also indicates that some teachers agree with the statement that tablets transform established teaching practices at school (M = 4.36, SD = 1.86). In order to examine teachers' appreciations in detail, a step-wise multiple regression analysis was used. The purpose of such analysis was to explain the variance in teachers' perceptions vis-à-vis the educational benefit of using tablets. In total, 88.3 % of the variance could be explained by a linear combination of the following variables: motivation & engagement, assessment & feedback, years of private tablet use (teachers), and multimodal learning and teaching (see Table 4).

Table 4. Step-wise regression analysis

Variable	β	t	p
Motivation & engagement	.45	6.79	0.01
Assessment & Feedback	.26	2.40	0.02
Years of private tablet use	.28	3.19	0.06
Multimodal learning	.41	5.14	0.01
F(df, 6, 24) = 28.61 R^2 = 0.915			
Adjusted R^2 = 0.883			
Standard error = 0.455			

These results show that the more teachers perceived tablets increase -pupils' motivation, -support assessment & feedback, as well as -multimodal teaching and learning, the more they had used tablets for private use and the more they were to perceive educational benefits of tablets in their teaching. As one can notice, the strongest predictors were using tablets for stimulating student motivation and engagement, and using tablets for multimodal learning and teaching. Furthermore, independent sample t-tests were performed to investigate possible differences between teachers who perceived that tablets improve students learning and those who did not put in relation to how they valued the thematic practice. Significant differences were found only to regards to two themes of practices, namely: multimodal teaching and learning and motivation and engagement. Teachers who perceived the use of tablets improve student learning ($M = 5.20$, $SD = 1.00$) valued tablet-mediated multimodal teaching and learning practices significantly more than teachers who did not ($M = 3.72$, $SD = 1.06$), $t(28) = 3.13$, $p < 0.05$. Teachers who perceived that the use of tablets improve students' performance ($M = 4.13$, $SD = 1.17$) also valued the benefits of using tablets for increasing motivation and engagement significantly more than teachers who did not ($M = 2.34$, $SD = 0.98$), $t(28) = 3.99$, $p < 0.01$.

4 Discussion

Looking at the results obtained on the tablet-mediated practices identified and how teachers value the tablet in such practices, one can wonder why teachers have such a positive view on the use of tablets in the classrooms? Also, why are they pointed at these specific tablet-mediated teaching practices? We discuss the following questions elaborating on the three following points namely: teachers' interest and enthusiasm in introducing a new artefact into the ecology of the classroom, associating digitalization with educational progress as well as materiality of teaching practices.

4.1 Teachers' Interest and Enthusiasm

The teachers who agree to participate in the study were teachers who were highly motivated to introduce digital tools into their school and teaching practices. The teachers we interviewed and observed were passionate by introducing change into their workplace and accepted with much enthusiasm to participate in the study because they had something to show us. Furthermore, these teachers have invested much time and efforts in organizing hands-on workshops, pedagogical seminars and meetings so teaching staff could share experiences, knowledge and skills in relation to the use of media tablets in classrooms activities.

4.2 Associating Digitalization with Educational Progress

The teachers seem to associate digitalization of school practices to modernization and educational progress. Many of them mentioned more than once the imperative of adopting a tool that has become central in the children's everyday life (i.e. smart

telephone or tablet). They conveyed a sense of "duty" of teaching children with and through tools that are part of children's worlds and Swedish society. Teachers also recognized media tablets introduce tensions into the classroom (i.e. entertainments games and social media platforms that are call "toys" by the teachers), but these were played down in their discourse.

4.3 Materiality of Teaching Practices

Results obtained about the types of tablet-mediated teaching practices identified as well as teachers' positive view of using tablets in the classroom, we contend, are associated to three main affordances tablets bring into the school: persistence of the digital medium, multimodality of the content and portability-ubiquity.

For instance, digital persistence [16] was referred to several times by teachers when explaining about the "mess" that distributing A 4 papers creates among pupils. Almost all the teachers agreed that handling school material electronically was a more effective way to save, search and centralize material. The persistence of the medium is not a detail when reflecting on how teachers value practices such as organization of teaching and documentation with tablets. For example, they can address pupils who often forget or loose teachers' homework, instructions or other type of information important to be aware of, to a shared and persistent workspace where all this material is centralized, accessible, organized and searchable. In that respect, the tablet via the use of LMS participates in building a socio-technical infrastructure [17] that organizes classroom work and facilitates face-to-face interaction and communication with the children.

Multimodality through the integration of sound, image to the written text is another affordance that is tightly connected to the emergence of multimodal teaching and learning practice [18]. This practice in particular was related to motivating pupils' to engage with school assignments and facilitating pupils' to construct learning material – instead of consume it. The entry of the image and sound into the classroom, through for instance Internet, it was also mentioned a reason for teaching pupils how to engage with emotional content in more critical ways. Furthermore, multimodality introduced an evidence-based assessment teachers found more reliable accurate and easier to share with pupils and eventually with interested parents. Also, the quantitative analysis performed indicated that a high valuation of multimodal teaching and learning practices by teachers was a significant predictor for perceived educational benefit of using tablets. Thus, this particular material affordance seems to be central for teachers and to a large extent explain their interest and enthusiasm in using tablets daily in their classrooms.

Portability and ubiquity of the tablet were associated with mobile learning, a practice that spoke of how teachers could organize teaching in different rooms and concentrate on the weakest groups. The fact that pupils can bring the tablets home facilitate for those who can not assist to the school or have troubles following tasks and assignments during classroom time.

Finally, we see an intricate relation between media tablets' affordances [6] and emergent tablet-mediated teaching practices [5]. Such a relationship, needs further examination as it underscores the value of design of digital devices in configuring today's school practices [9, 12, 16].

These devices once adopted in the classroom, influence, via their specific material characteristics current practices that oriented toward the construction of school knowledge [12, 19]. A thoroughly understanding of tablets' affordances through the analysis of teaching practices at schools will thus help researchers and designers in the TEL field better cognize how digital tools are transforming contemporary forms of learning. We thus believe research studies on the materiality of tablet-mediated practices are most than welcome at this stage, as Nordic schools for the most part, have entered the complex process of digitalization.

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