# Mobile learning for homework: Emerging cultural practices in the new media ecology

## El aprendizaje móvil en las tareas escolares: Prácticas culturales emergentes en la nueva ecología mediática

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## Abstract

This contribution discusses emerging cultural practices of media activities with the example of homework as an out-of-school learning context. Data was collected using diaries on the use of media during out-of-school learning activities. Central theoretical frameworks include the German theory of Medienbildung as an actor's threefold relation towards the material/factual world, the other/s and society, and her-/himself and the socio-cultural ecology of mobile learning as a triangular relationship between agency, cultural practices and structures. Following a grounded theory approach, data analysis was conducted in an inductive manner, drawing on contemporary methods of computer enhanced qualitative analysis. This article focuses on verbal expressions within the diary entries, implicating cultural practices in everyday media activities and their impact on media use in a domestic learning context, such as homework. Two central aspects are highlighted from the results, exemplifying the category and theory generation. First, "checking", as one of the reappearing in-vivo codes, will be examined more closely regarding its embedding in media practice and homework. It will be characterised as a daily recurring receptive and productive media practice. Second, apps and services, as well as media hardware used at school, are mirrored in the way students actually use media during homework, mingling with everyday media practices.

## Resumen

Esta contribución se centra en prácticas culturales emergentes en las actividades mediáticas, tomando las tareas como ejemplo de contexto de aprendizaje extraescolar. Usando diarios, se recabaron datos sobre el uso de los medios en las tareas. Sirven como marco teórico, por un lado, la teoría de Medienbildung como triple relación del actor con el mundo material/objetivo, los demás/la sociedad y consigo mismo; y por otro, la ecología sociocultural del aprendizaje móvil, como relación triangular entre agency, las prácticas culturales y las estructuras. Siguiendo la teoría fundamentada, el análisis de datos se realizó de modo inductivo, empleando métodos de análisis cualitativo asistido por ordenador. Este artículo se centra en las expresiones verbales que implican prácticas culturales en las actividades mediáticas cotidianas, así como en su impacto en el uso de medios en un contexto como el de las tareas. Se destacan dos aspectos centrales de los resultados, que ejemplifican la generación de categorías y teorías. En primer lugar, «checking», uno de los códigos in-vivo que se repiten, se analizará a fondo respecto a su incorporación en las prácticas mediáticas y los deberes. Se caracterizará como práctica mediática receptiva repetida diariamente. En segundo, tanto las aplicaciones y los servicios como el hardware de medios empleado en la escuela se ven reflejados en el modo como los alumnos emplean los medios cuando hacen las tareas, combinándolos con prácticas mediáticas cotidianas.

## Keywords / Palabras clave

Media education, secondary school, homework, software, smartphones, social media, qualitative analysis, quantitative analysis.
Educación mediática, educación secundaria, tareas escolares, software, smartphones, redes sociales, análisis cualitativo, análisis cuantitativo.

# 1. Introduction

When discussing risks, threats and opportunities of digitalisation (Floridi, 2014), and processes of deep mediatization (Hepp, 2017), perspectives on opportunities are often left out (Condruz-Bacescu, 2019). Not to fall into a trap of un-reflected utopianism, drawing data from social realities and analysing them with a focus on opportunities is essential to be able to make data-driven statements in a discussion that is normatively shaped by over-protectionism on the one hand and euphoria on the other (Selwyn, 2011). This applies especially for children and young people and their media environment.

In the perspective of media studies and media education there are a couple of recurring studies on everyday media usage. In order to draw conclusions and to make recommendations as precisely as possible, it is necessary to use country specific usage data. Literature and data reviews for European, but especially for German speaking countries, in preparation for launching the presented project, revealed that until 2018 there was no detailed data or project report on the intersection between homework and media usage. Esp. literature in the field of media education either assumed or demanded that there would or should be media use involved in homework (Rummler, 2018). Other data mentioned some interrelations (Feierabend et al., 2017; Suter et al., 2018) but could not give further detail on cultural practices of homework and media use. The gap in research and scarcity in literature motivated this project. Looking into literature on homework, descriptions, and definitions as a didactic feature of planning lessons (Mischo & Haag, 2010; Haag & Streber, 2015) are pervasive. Aspects of parent involvement and its effects (Wild & Gerber, 2007), as well as explorations of homework effects on self-efficacy, have been conducted (Trautwein & Lüdtke, 2014). In the literature, little attention was paid to the ways students themselves develop practices of "doing" their homework. In respect to media and homework, profound data was missing on which (media) resources (apart from recommendations which media to prescribe on part of the teachers) pupils are actually using in their domestic learning environments, let alone, what meaning they make of their media environment.

The following contribution presents outcomes of the Swiss exploratory study "Homework and Media Education" (http://p3.snf.ch/project-175909) which investigated the media use of secondary school pupils in domestic learning contexts (Sharples et al., 2010; Rummler, 2018; Rummler et al., 2018). This exploratory study follows an inductive approach of qualitative research with its aim of mapping the field, i.e. identifying structures, patterns, and dimensions of the interrelation between homework and everyday life media use, working on a data-driven, grounded theory. The guiding questions marking the field to be mapped are:

- In the context of complex home media and learning environments (media ecology), how do pupils use media as resources for their daily learning practice?
- In which ways do pupils select and find orientation within the wide range of media and the resulting opportunities?
- The two preceding questions lead to the central question:
- How do pupils perform agency within their daily media-practice appropriating and making sense of social, cultural and technical structures?

Asking for agency raises questions of enabling and restraining social practices and structures (Pachler, Bachmair, et al., 2010; Giddens, 1984). Those become visible from pupils' ways of reflecting upon these structures.

Within the project, domestic learning means "doing homework" in a wider sense (Aßmann, 2013; Kohler, 2011; Hascher & Hofmann, 2008; Kress, 2010). This working definition covers oral, written and/or performed tasks directly posed by teachers, plus activities for school, like preparation and general learning to be carried out outside the lesson during in- and out-of-school-settings (Trautwein & Lüdtke, 2014). This definition also includes contemporary forms of schooling where the afternoon is not spent at home but in learning-support or day-care institutions. In the context of the researched schools, the project team found diverse forms of support and supervision, including fulltime and part time day schools with and without lunchtime, as well as stay-at-home parents and grandparents. Thus, together with learning practices, it is possible to cover a variety of structures of homeschooling along with insights into daily lives and routines of pupils.

Drawing upon an understanding of media formation (German: Medienbildung) the project team argues that media are substantial for individual constructions of world- and self-relations (Spanhel, 2010). Emergence of these relations are reflected in individual articulations, perceived as acting with, through and towards media (Marotzki & Jörissen, 2008). Media use and appropriation (Pachler et al., 2010) are substantial for understanding the concept of formation regarding media as Medienbildung (Pachler et al., 2010; Meder, 2011: 71f). The constitution of this relation of individuals towards themselves and towards the world (including media) is mutual and reflective. It shapes media use as well as agency in the sense of an ability to act upon the world

(Archer, 2000). The threefold relation in respect to media and their functions is developed towards: the material/factual world in the mode of representation; the other/s and society through communication; and Her*self/him*self throughout the life-course across interaction (Meder, 2007: 65).

Besides focusing on the individual's relations and personal development, the project team takes a wider view on the development of reflexive agency through everyday media practice (Buckingham & Sefton-Green, 2003). The project team locates those practices embedded in media ecologies (Fuller, 2005) reflected in the triangular relation of social and technological structures, agency and cultural practices (Giddens, 1984; Lefebvre, 1958; Pachler et al., 2010). Thus, everyday activity is assumed as a part of this ecology of the physical and structural world (Luckin, 2008; Rummler, 2014). Consequently, it is an active process of appropriation within (media)activity and the inherent agency constituting the assumed reflexive relationship between individual and collective life-worlds (McDougall & Potter, 2015). The notion of culture and cultural practices is seen as rather routinised common activities in everyday life. In this sense, in the context of homework and interrelated patterns of media usage, which themselves shape pupils' meaning-making.

## 2. Sample, material and methods

For the project, the research team established access to teachers and their school classes through the associations of Swiss teachers (LCH) and of Swiss school principals (VSLCH). This approach resulted in a desired heterogeneous composite sample of schools offering varying levels of autonomy, which is typical for the Swiss school system.

After pre-studies in 2016/17, the main survey in autumn 2018 involved 250 pupils from 25 secondary 1 school classes (7th to 9th grade) in seven German-speaking cantons in Switzerland, using pupils' media diaries (Rummler, 2018; Rummler et al., 2018) in accordance with parental consent. As parents had to give consent to the use of data on an individual basis, only four school classes could be surveyed as a whole. Additional 21 classes took part with an average return of 8,38 of 17,53 pupils per class (overall return: 73.96%).

The resulting sample consisted of 138 (55%) female and 108 (43%) male pupils, where 4 pupils did not answer on their sex. The average age is being 13.24 years, where 7 answers about age are missing. Information about migration backgrounds was gathered by asking for languages spoken at home (return: n=239). German languages were aggregated and re-coded. Thus, three groups emerged: At the homes of 9% of the pupils only non-German languages are spoken. 26% of the pupils in the sample grow up in households where a German and at least one non-German language is spoken. In 65% of pupils' households only German languages are spoken. 29 non-German languages were named in the sample. The households' socio-economic level was not determined.

Media diaries as a survey instrument (Gleaves et al., 2007) foster the above-mentioned threefold relationship through self-reflection. Reflective elements are interpreted in terms of (Media-)Bildung (Meder, 2015) based on an understanding of formation (Bildung) as both the process as well as the result of a reflexive relation of the individual towards the world through articulation.

These processes are documented in the format of diary notes in terms of the individual's educational engagement with the material and social environment (Meder, 2007; 2011). Furthermore, the diaries also serve to document self-reflective processes (Meder, 2015). For this reason, the study also deals with the question of how to interpret such processes as (media) educational processes.

The "media diary" is the central instrument in a mixed methods research design that consists of four parts to be completed in writing:

1) Introductory sociodemographic questions.

2) Closed-ended questions regarding support and supervision of homework by parents and other actors in the pupils' social surroundings. In addition, questions are asked about the support the pupils receive from selected media for their homework, and which actors in everyday life are significant in their media activities. These questions were formulated as a four-level scale (never, sometimes, often and always, plus no specification) and were answered by the pupils with the help of the researchers during the introduction of the instrument in the school classroom.

3) The actual "media diary" is conducted in form of a written survey led by an open-ended question encouraging the pupils to report media activities in the context of homework for two weeks.

4) Three open questions at the end of the diary provided the opportunity to reflect on homework during the two weeks of the survey.

The quantifiable data from the closed-ended questions were entered into Microsoft Access, and the open-ended questions in the media diaries were transcribed and organised via Adobe Acrobat PDF forms, and

collectively imported into MAXQDA. The media diaries were coded in MAXQDA using word-for-word coding. The coding scheme was inductively developed –relying on previous coding indicated by pre-studies (Rummler et al., 2018)– and further refined in an iterative process of open coding (Kelle, 2007), concept and category formation (Mey & Mruck, 2011). The open process was maintained as long as possible, thereby revealing a large number of individual codes (Kuckartz, 2010). Several rounds of interactive coding were undertaken to develop a common understanding and consensus of codes within the team, according to advice for teamwork in grounded theory analysis given by Corbin and Strauss (1990).

In the course of this process, the team developed four code dimensions in order to differentiate between the different aspects of media:

- The dimension "medium" comprises all types of hardware mentioned by pupils in their diaries. All physical devices for storage, transmission, playback, display, and (re-)production of signs –i.e. (media) hardware such as TV sets, smart TVs and smartphones– were coded (suggestions for a definition of media in Rummler, 2018; Herzig, 2016; Swertz, 2000).
- The dimension "representation" describes types of media content, such as radio stations' programming, YouTube channels, or specific types of messages like emails, Snaps –messages within the Snapchat app– or videos. The definition was refined with reference to Stuart Hall's notion of "representation" in the sense of "processes by which meaning is produced" (Hall, 1997: 1), and it is helpful to distinguish levels of representation as practice as well as its symbolic function: "[…] a kind of 'work,' which uses material objects and effects. The meaning depends, not on the material quality of the sign, but on its symbolic function" (Hall, 1997: 25).
- The dimension "apps/services" includes all types of software and applications, services and websites enabling the use of particular modes of representations on local hardware devices.
- The dimension "media activities" was used to capture verbs indicating direct references to practices constituting activities associated with various media (incl. apps/services, representations, or hardware). This dimension of codes literally specifies what pupils do with media.

The code groups were developed following the "'coding paradigm' of conditions, context, strategies (action/interaction), and consequences" (Corbin & Strauss, 1990: 13) in grounded theory, working towards categories by relating the codes emerging in the open coding process to code groups as their components. This process of upward differentiation was applied to the code group of "everyday activities". Separation precision against scheduled activities was achieved by differentiating e.g. training in a sports club or music lessons from other "leisure time activities", such as arranged social meetings and "school activities", including homework. By distinguishing these different contexts including their ecological resources, it was possible to relocate the documented media activities within routines and recurring situations. During the coding process, combining the code groups helped to describe temporal, spatial-local and social constellations and link media activities to them.

To isolate homework activities in the data, the code dimension "activities for school" was created and codes indicating the physical location and time of "inside school" were excluded. While this describes the technical filter algorithm in MAXQDA for the retrieval of "homework" codes it also covers a wide range of activities in relation to school but outside the lesson/school building, and suggests an expanded, data-driven working definition of "homework" for the project in correspondence with the elaborated definition, based on literature, above.

Pupils, in most cases, reported incidents in the media diary as single entries, often in form of standalone phrases or individual sentences. These entries served as entities of analysis and were consequently treated as single lines of data. The joint occurrence of codes within these basic entities carry expressions and articulations that help to explain how media use is entangled in everyday practice. The identification of commonly occurring word combinations in single lines of data meant to apply the concept of "collocations" to explore forms of these expressions. In phraseology, located in the science of linguistics, these sets of word combinations are called "collocation". This refers to co-occurring, but non-idiomatic word combinations that mean more than the sum of their parts (Burger, 2007:38f.). Technically, in MAXQDA this means to filter codes that have a proximity of "0" and the search is limited to the occurrence of codes that meet in a single line. Thus, specific word combinations could be determined by means of systematic search (i.e. co-occurrence in a single entity resp. code line) and were evaluated according to their frequency. If patterns of associations resp. collocations occur frequently, it is assumed that they name specific routines taking place in everyday life, that could be interpreted as cultural practices (Buckingham & Sefton-Green, 2003; Pachler et al., 2010).

## 3. Results

The following presentation of results focuses on two aspects. First, the example of "checking" will be reconstructed, revealing it as an everyday media practice associated with popular media. Second, we investigate media activities in the context of homework in Mathematics and English language education to determine how pupils appropriate and make sense of their media environment for learning purposes.

### 3.1. Pupils' use of language as an indication of media activities

What follows is an analysis of how pupils describe their own media use. Early morning media activity, for example, is in many cases described as sets of word combinations (collocations) such as "WhatsApp" (coded as "apps/services") and the verb "checking" (coded as "media activities").

**Figure 1. Collocations with WhatsApp, Snapchat, Instagram**
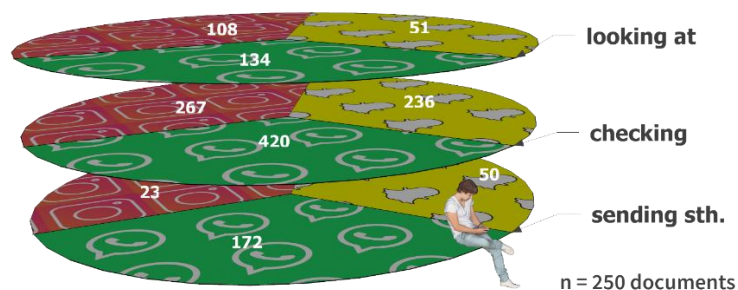


"Checking" was one of the in-vivo codes (Kelle, 2007) most found as collocation with the three dominant Social Media Apps. It occurs 811 times in the entire dataset. "Checking" was mentioned in collocation with WhatsApp 420 times, with Instagram 267 times, and with Snapchat 236 times. The pupils note "ISW" as an abbreviation when all three apps are checked as a unit. Checking could be dimensioned on a range of activities from a quick look to an actual use of an app to see if there was new content. "Sending [something]" and "looking at [something]" are further relevant verbs with importance for the focus on "checking" as a practice. Whilst "sending" primarily occurs in collocation with Snapchat and WhatsApp, "Looking at", in contrast, is mainly used in collocation with WhatsApp and Instagram, and only to a limited degree with Snapchat. Only "checking", so the first conclusion, combines practices connected to all three of the most mentioned apps.

### 3.1.1. Discussion: "Checking" as cultural practice

"Checking" is to be understood as a particular media activity or cultural practice that is both receptive and productive. Nevertheless, it is distinct from "sending" and "looking at", as could be seen in the section above. How is "checking" to be interpreted as a (cultural) media practice? Close examination and comparison of different data showed that pupils are not checking in the sense of testing functionalities, but rather verifying whether new messages or posts have arrived. In addition, "checking" involves a way of receiving information and of skimming or browsing content. But the reception does not go as far as "looking at"; rather, it corresponds to registering, filtering and appropriating relevant information and content. The frequency of this practice and its integration into pupils' routines, recurring in similar settings, at similar times, in similar time-space-contexts, suggests that new posts and new messages, as well as following them frequently is an established cultural practice or media-related routine in the everyday life of pupils.

A different interpretative reading of the collocation "checking" suggests appropriation as a way of receiving information and making sense of it. "Checking" corresponds to registering, filtering and selecting relevant information and content. The authors interpret "looking at" as activities related to reading messages in the sense of a mere receptive activity, more intense than "checking". "Sending" more explicitly indicates writing and production of media representations such as messages. In this sense "checking" is a generic term, covering the quick skimming of messages, as well as distinct and deliberate reading, only sometimes including the productive writing of new media representations and content. With reference to an understanding of the formation of self- and world relations (Medienbildung), this practice leads to an interpretation of pupils'

engagement and construction of their relation towards the world/media structures represented in social media apps and their possibilities and restraints for action. In the course of "checking" they are actively working out their relation towards the social other(s) making distinctions between new and familiar information, and knowledge. Within this recognition and processing of communicated information and content they act upon the world, making sense of it and prioritising which leads and offers for social meaning-making they follow and consider for their own media action. Close reading of the data suggests that "checking" is a cultural practice as a set of activities that pupils have developed in the triangular relationship between agency and structures within the socio-cultural ecology of everyday media use.

## 3.2. Pupils within the media ecology of homework

When studying the relationship between pupils and their media ecology in the context of homework, it is necessary to develop an operationalisation of the practice of homework. One question arising when asking for homework and media concerns hardware and apps/services used by pupils. This leads to the inquiry of connections between media/apps and school subjects. Drawing upon the elaborated method of collocation, it was possible to search the data for single line co-occurrences of codes from the dimensions "medium" plus "school subject" or "apps/services" plus "school subject". This is the combination of two collocations allowing for the meaningful qualitative correlation of three dimensions.

### 3.2.1. The use of apps/services and hardware for homework in Mathematics

There is a diverse use of apps/services for homework in Mathematics and Microsoft Office365 with its applications Teams, Word and Excel were the most mentioned (30 mentions in n=149 documents). Second is WhatsApp (14 mentions in n=149 documents), YouTube (8 mentions) is third and Google (5 mentions) is fourth. Online services offered by school-book publishers were named 4 times. Four other apps/services were stated 3 times or less. See Figure 2: The use of apps/services and hardware for homework in the subject Mathematics in Figshare (https://doi.org/10.6084/m9.figshare.12250166).
The school or exercise book as specific hardware was named 10 times (plus one mention of unspecified documents and papers). Second is the computer or laptop which was indicated 8 times. The smartphone was mentioned 3 times, and a tablet computer was only stated one time. One pupil pointed out on a watch.

### 3.2.2. The use of apps/services and hardware for homework in English

The bandwidth of apps/services used for homework in English is less than in Mathematics. The most mentioned application or service is Quizlet (53 mentions in n=149 documents). 21 pupils state websites resp. services for translation. Others mention YouTube (7) and Google (5). Two pupils refer to the app/service "GoStudent".
See Figure 3. The use of apps/services and hardware for homework in the subject English (https://doi.org/10.6084/m9.figshare.12250154).
In terms of media hardware, the smartphone is most mentioned, with 11 times for homework in English. The schoolbook is mentioned 5 times, and computers or laptops are mentioned 4 times. Portable Bluetooth loudspeakers, unspecified documents and papers, and a data projector are only mentioned one time each.

### 3.2.3. Discussion: Schools' use of hard- and software has impact on homework

The use of Office365 in Mathematics in the combination with laptop computers and the use of Quizlet in English language education in combination with smartphones for homework is striking. Additional background information shows that within the sample there are some schools and classes that have established an environment of schoolwide WiFi along with one-to-one laptops (such as Google Chromebooks) making use of the Swiss-wide Office365 framework-contract. In relation to the theoretical framework, this example shows that infrastructures such as notebook computers and online learning environments directly relate to pupils' agency and ability to act upon their world in the context of domestic learning. In practice, it means that it makes sense to invest in a school wide wireless Internet access (WiFi) plus a learning management system, incorporating software-as-a-service (SaaS) such as Office365. The data shows that –within this environment– laptop computers do make more sense than just tablet computers as they provide a fully equipped operating system

which is ready for everyday production use. The instant messaging system WhatsApp seems to provide an accompanying level of communication.

The language education subjects provide a different but complementary picture in that teachers provide tasks on the platform Quizlet which pupils are fulfilling on their smartphones. Additionally, pupils are using translation apps and services. Both work well browser-based on smartphones as well as on laptop computers. Homework in both subjects (Mathematics more than English) use traditional paper-based school and exercise books, as well as documents and papers.

## 4. Discussion and conclusion

The project "Homework & Media Education" and its team question how pupils use media as resources for their daily learning practice within their media ecology and in which ways pupils select and find orientation within the wide range of media and the resulting opportunities. The central question is how pupils perform agency within their daily media-practice considering social, cultural, and technical structures.

The ways and modes in which media are integrated in learning practices by pupils, drawing from their everyday media practice as resources, show manifold ways of not just reaching the goal "homework completed". Pupils integrate their media environment into daily learning practices by diversifying their media ensemble according to their needs and possibilities. This practice of integration demonstrates how pupils actively produce their own learning contexts. This production of contexts, i.e. actively overlapping characteristics and practices of different contexts, is one of the central performances of pupils' agency. In the survey resp. in the media diaries the pupils were asked to note media activities in the context of their homework, displaying a much wider range of activities than just the obvious completion of homework. This demonstrates the fluidity and overlap of the school's learning context and everyday life outside school.

The example of "checking" and its collocations with popular Apps such as WhatsApp, Instagram and Snapchat show how it is possible to argue that smartphone-centred media activities can be described as an emerging cultural practice. It does not only occur as a routine in the data but expands from everyday life media use towards being appropriated for not originally designed purposes (such as learning/doing homework). As could be shown, these emerging cultural practices, including the use of hardware as well as apps/services, are deeply integrated into homework as school-associated activities in out-of-school contexts (Blair et al., 2017). Besides traditional didactic and educational functions of homework, discussed in the introduction, the presented results suggest widening the view on media use from "traditional" school media to everyday media integrated by students into homework and learning activities. Although the data provides rich insights on mornings, afternoons and evenings, activities with media inside school was rarely mentioned by pupils and was not a focus of this study. However, the data allows inference on media used for specific school tasks and subjects (such as English vocabulary training in Quizlet), mirrored in the domestic learning practices. The sample size is rather large but heterogeneous for a qualitative study, which fosters computer-aided data handling, documentation, and analysis by exploiting most recent procedures in qualitative analysis.

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