

Forbidden and necessary: making sense of smartphones in vocational teaching

Forbidden and necessary

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Abstract

Purpose – The digitalization of schools has intensified in recent years. It is reflected in policy documents as well as in extensive investments in digital technology and professional development initiatives to promote digitalization. At the same time, attempts are being made to “tame” the same digitization sometimes by regulations banning smartphones in class. This study aims to examine how smartphones are interpreted by vocational teachers in Sweden using the theoretical lens of technological frames.

Design/methodology/approach – The data consist of ten semi-structured interviews with vocational teachers, representing eight vocational programs in Sweden.

Findings – The results show breadth in how teachers understand, interpret and relate to the smartphone in vocational education. The authors show how the smartphone often forms an integral part of professional work and is thus difficult to separate from vocational teaching and nurturing vocational competencies.

Originality/value – The authors’ contributions include using technological frames to explore how smartphones are interpreted and understood by vocational teachers by demonstrating how they relate to the nature of the smartphone, the strategy for the smartphone and the smartphone in use. The theoretical framework is used to interpret restrictions on technology use, in this case a smartphone, in education. The results could be of interest to researchers as well as to teachers, school leaders and policymakers.

Keywords Smartphones, Vocational education, Technological frames, Teachers, Digitalization

Paper type Research paper

Introduction

For decades, there have been extensive efforts to promote digitalization in education. Such digitalization push is reflected in policy (Godhe, 2019; Olofsson *et al.*, 2021), through extensive investments in technology and digital infrastructure (Cuban, 2009; Player-Koro and Tallvid, 2015), and through educational initiatives aimed at promoting digitalization in schools (Lantz-Andersson *et al.*, 2022; Pareto and Willermark, 2022). In the case of vocational education, rapid and ongoing changes in working life with technological development have put pressure on vocational education and training to become more responsive to the needs of society and working life (Belaya, 2018; Dobricki *et al.*, 2020; Enochsson *et al.*, 2020). At the

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same time, school digitalization is a controversial and rather debated issue (Iivari *et al.*, 2020; Ott, 2016; Selwyn, 2017). Thus, while the school is being digitalized, efforts are being made to “tame” the digitalization in schools. It can include controlling which websites or apps the students have access to or simply banning smartphones in class. There are many examples of banning smartphones in an international context (Beneito and Vicente-Chirivella, 2022; Gao *et al.*, 2014; Kessel *et al.*, 2020; Selwyn and Aagaard, 2021). In this study, we focus on the case of Sweden, which recently initiated a change in the law where the teacher gets an extended mandate to dispose of their students’ smartphones. The purpose is stated to increase security and to contribute to an adequate study environment, with the stated goal to increase the study results (SFS2022:940). In this study, we explore how the smartphones are interpreted by vocational teachers in Sweden, using the theoretical lens of technological frames. The research question is as follows:

RQ1. How can vocational teachers’ approach to smartphones in teaching be understood?

Related work

Research has for a long time addressed the smartphone in education from different perspectives. In this section, we report on recent studies that explore smartphone and smartphone regulation in education in general and within vocational education in specific.

It has been argued that the smartphone has already become an integrated part of the student’s infrastructure for learning (Almén, 2021; Grigic Magnusson, 2022; Ott, 2017). Research shows how smartphones in an educational context can facilitate learning as well as cause disruption (Grigic Magnusson, 2022; Ott, 2017; Sung, 2016). Using mobile devices such as smartphones has become common for educational purposes because of its ability to facilitate communication and to connect students to the internet (Thomas and Muñoz, 2016; Yildiz and Alkan, 2019). The benefits are described as, i.e. its potential to engage students from anywhere at any time, to collaborate and to differentiate instruction as well as facilitate self-regulated learning (Thomas and Muñoz, 2016). However, several studies report that smartphones have been a reason for conflicts and tension (Beland and Murphy, 2016; Merchant, 2012; Ott, 2017). “Smartphone addiction” is highly emphasized in research (Bagci and Peksen, 2018; Chen *et al.*, 2011; Yildiz and Alkan, 2019) as well as highlighting smartphone as something that gives rise to distraction among students (Almén, 2021; Beland and Murphy, 2016; Thomas and Muñoz, 2016). The chances of students using smartphones in harmful ways that increase the risks of cheating or bullying are also stressed in the literature (Callan and Johnston, 2022; Leino Lindell, 2018; Ott, 2017). From a student perspective, smartphones are often considered as a useful tool in teaching yet underused by teachers. Still, students state that they struggle to balance their use for educational and private purposes (Ott, 2017). Arguments for banning smartphones in school are one path that has been taken by politicians, schools and teachers, but not by all. Many teachers permit students to use smartphones in class, not least as an educational tool (Almén, 2021; Beland and Murphy, 2016; Grigic Magnusson, 2022; Ott, 2017). There is little research on how teachers can meet the challenges, and at the same time, make the most of smartphones in the process of teaching (Langseth and Sedal, 2019). Langseth and Sedal (2019) suggest that instead of teachers adopting a top-down perspective, including restrictions and banning smartphones, teachers should empower students to make appropriate choices on when and how to use the smartphones. Similarly, Leino

Lindell (2020) suggests that teachers should involve students when forming practices of how the smartphone could be used.

In vocational education contexts, research on digitalization and the use of smartphones is underdeveloped (Asplund and Kontio, 2020; Cattaneo *et al.*, 2022). However, there are studies that have explored the use of smartphones (Enochsson *et al.*, 2020; Haro Escribano *et al.*, 2022; Hegarty and Thompson, 2019; Kontio and Asplund, 2019; Motta *et al.*, 2014). Motta *et al.* (2014) conducted a study comparing how headband cameras and smartphones could capture video material from the workplace and thus facilitate connectivity between the workplace and educational context (Motta *et al.*, 2014). Another study highlights the potential for student engagement when using smartphones with different applications in vocational education. In the study, different applications were explored by the teacher and by using devices familiar to the students, which were suggested to enhance autonomy and confidence among the students (Hegarty and Thompson, 2019). Haro Escribano *et al.* (2022) explore the “problematic use,” i.e. focusing on Internet gaming disorder of smartphones among vocational students in Spain, and the results indicate a low prevalence of problematic use however differences between genders and higher among females.

In a Swedish context, the interaction between students when using smartphones, at two different vocational programs, was explored (Kontio and Asplund, 2019). The findings indicated that the use differed from individual to collective use. The male-dominated *building and construction program* was demonstrating a collective use, manifested by students showing and inviting classmates into their activities on their smartphones. At the female-dominated, *hairdresser program*, more individual use was demonstrated, and the interactional traits were not occurring. The differences were partly understood as related to the student’s professional identity. One study explores how the smartphone is related to risks in the vocational classroom (Asplund and Kontio, 2020). Findings indicate that the use of smartphones does not necessarily contradict the teacher agenda but mainly comes with other risks. The risk of lacking focus on risky moments that potentially could injure other students or material. Or by potentially harming other students’ integrity, when posting videos or pictures online (Kontio and Lundmark, 2021). Another study gives examples of how using smartphones and applications, i.e. social media in vocational education, is one way of closing gaps between education and working life (Enochsson *et al.*, 2020). Overall, different approaches to smartphone are demonstrated in previous research. It ties in with previous research that sheds light on how the use of digital technology in teaching is highly connected to teachers’ attitudes toward digital technology (Ollinen, 2019; Scherer *et al.*, 2018; Tondeur *et al.*, 2017).

Theoretical perspective

Examining people’s underlying assumptions, expectations and knowledge related to technology is central to understanding technological development and use within an organization (Orlikowski and Gash, 1994). They conclude that “Different technological frames imply different ways of knowing and making sense of technology” (Orlikowski and Gash, 1994, p. 30). Technological frames constitute a conceptual framework to analyze the interpretations that people develop in relation to technology. It has been widely used to explore how organization members make sense of technology (Davidson, 2006; Kiene *et al.*, 2019; Leonardi, 2011; Spieth *et al.*, 2021). According to Orlikowski and Gash (1994), people have to make sense of technology to interact with it. In that sense-making process, people develop certain knowledge, assumptions and expectations in relation to technology, which shapes certain actions toward the technology. It includes the nature of technology, which refers to people’s images of the technology and their understanding of its capabilities and

functionalities; technology strategy, which refers to people's views of why their organization acquired and implemented the technology; and technology in use, which refers to people's understanding of how technology will be used on a day-to-day basis and the likely or actual conditions and consequences associated with such use (Orlikowski and Gash, 1994). The technological frames are linked to individuals and thus reflect individual variations yet are often consistent with people who share work tasks and experiences within an organization. Orlikowski and Gash (1994) refer to these types of shared frames as group frames. When there is congruence in technological frames across key actors, there are similar expectations regarding the role of technology in the organization and the nature of technological use. When there is incongruence in the technological frames, there are diametrical "differences in expectations, assumptions, or knowledge about some key aspects of technology" (Orlikowski and Gash, 1994, p. 180). When the technological frames differ significantly between different key actors within an organization, for example, managers, system developers and users, difficulties and conflicts arise connected to the development and use of the technology. The degree of congruence and respective incongruence is assumed to explain opportunities and difficulties related to the implementation of technology within organizations. In case of incongruence, implementation problems arise where expectation differs from use. With strong congruence, the organization's structure and strategy are supported more effectively than with an incongruent organizational culture. The technological frames are not static; instead, they are changeable, and context-bound. Technological frames have often been used to study the implementation of technology in organizations (Calleja and Camilleri, 2021; Camilleri, 2012; Orlikowski and Gash, 1994; Selwyn, 2014). We also use the framework to study technology, in this case, the smartphone in relation to an organization. Yet, in this study, we use the technological frames to explore how restrictions of smartphones are interpreted and understood by teachers.

Method

Below is a brief description of the empirical context, followed by a report on the data production and analysis.

The empirical context

Sweden was early adopting the implementation of digital technology in school, which has been followed by both extensive investment in digital technology and several national large-scale projects over the year with the goal of advancing the use of technology in school (Olofsson *et al.*, 2021). Digitalization in Swedish schools is driven by the national strategy for digitalization from the government (Skolverket, 2022a; Utbildningsdepartementet, 2017). In the strategy, it has been proclaimed that Sweden aims on becoming world-leading when it comes to taking advantage of the possibilities of digitalization. This includes the development of a high digital competence among students and the promotion of knowledge development and equivalence (Utbildningsdepartementet, 2017). However, on January 27, 2023, the newly appointed minister of school communicated the need to pause the national strategy by arguing for a need for more research exploring the risks of using digital technology in education. It demonstrates an ambivalence from a policy level that creates a lack of clarity among teachers regarding digitalization in school.

In the Swedish Education Act of 2011, with an additional change from 2022, the smartphone is mentioned in the fifth chapter, which contains paragraphs about security and a calm environment conducive to learning. The content in the legislation states that using smartphones in class is only allowed when the teacher finds it appropriate and for increasing learning or if it is in line with the need of students with special needs. It is also stated that the principal or the

teacher is allowed to collect the smartphones from the students both for preventive purposes and if it is causing a disturbance. It is stated in the education act that for every school unit, there shall be established written rules of procedures for collecting mobile phones and other equipment for communication. The principal is responsible for establishing those rules (SFS, 2010:800). At first, the smartphone was not included specifically among the objects described to possibly threaten the security or disrupt the teaching. In the original legislation, all objects that could do so were allowed to be collected by the teacher (Ott, 2017). The new formulation in the legislation was added on August 1, 2022. However, the norm was already before the new formulation, not to use the smartphone for private purposes in class. Thus, at the time the new formulation was included in the education act, it has been reported that eight of ten compulsory schools and half of the upper secondary schools already practiced the regulation of not using the smartphone in class (Grigic Magnusson, 2022; Skolverket, 2022b). The more explicit formulation from 2022 (SFS, 2022) has roots in the debate about falling results, bullying and the lack of a calm environment conducive to learning (Ott, 2017). Ott (2017) states that another reason that smartphone has been considered less important for the digital infrastructure is that it relies on private ownership. Thus, arguments for not including smartphones in teaching are related to the idea that education should be equal. Teaching in school should not rely on other teaching materials than the ones offered by the school (Ott, 2017). Also, there is a global trend of banning students' use of smartphones (Grigic Magnusson, 2022).

Data production and analysis

To explore how vocational teachers interpret the smartphone in teaching, qualitative interviews were conducted with ten vocational teachers representing eight different vocational programs in Swedish upper secondary education (see Table 1). The participants were recruited from a previous survey carried out by the authors (Carlsson, 2023) that explored vocational teachers' experiences in using and developing teaching material. To increase the variation of the vocational programs represented, two additional vocational teachers were recruited; thus, the selection can be considered strategic (Bryman, 2016). The interview guide included general questions about how the informants viewed their teaching assignments in general, opportunities and challenges in their role as vocational teachers and learning resources. Besides, specific questions about how they perceive that digitalization is affecting their teaching were addressed. The interviews lasted between 35 and 60 min and were transcribed verbatim. All interviews took place within the informants' workplaces. A qualitative content analysis was carried out (Graneheim *et al.*, 2017). First, the authors read the transcripts in full, to get an overall understanding of the material. Next,

Informants	Age	Years of teaching	Vocational program
Andreas	38 years	0–5 years	Electricity and Energy Program
Helena	50 years	6–10 years	Business and Administration Program
Pernilla	39 years	6–10 years	Natural resource use/Business and Administration Program
Rebecka	48 years	11–15 years	Health and Social Care Program
Olof	37 years	6–10 years	Child and Recreation Program
Konstantin	37 years	0–5 years	Vehicle and Transport Program
Victor	37 years	6–10 years	Heating, Ventilation and Sanitation Program
Cornelia	45 years	6–10 years	Restaurant and Food Program
Lennart	61 years	More than 15 years	Electricity and Energy Program
Peter	33 years	0–5 years	Electricity and Energy Program

Source: Authors' own work

Table 1.
Overview of data

the authors selected the parts in the transcriptions that in some way addressed digitalization in vocational education. Thereafter, the text was divided into meaning units and condensed the units. Codes were created, such as “Learning resources online,” “Digital learning resources connected to vocation” or “Smartphone as central in teaching for the vocation.” Third, the authors reviewed and clustered the codes addressing the smartphone. Finally, technological frames were used as a theoretical framework to analyze the data and identify teachers’ technological frames. During the analysis, the authors compared their categories with the original data and discussed the meaning of the themes in relation to that (Graneheim *et al.*, 2017). Finally, in the analysis, we gave the informants pseudonyms.

Results and analysis

Below, we present and discuss teachers’ perspectives on the smartphones in teaching based on the nature of technology, technology strategy and technology in use.

The nature of technology

Teachers express different images of the smartphone and its capabilities and functionality. Some teachers describe the smartphone as solely or mainly as private technology that is used for leisure and make a clear distinction between the smartphone and other technologies such as tablets or laptops. Others describe the smartphone as a complement to computers and tablets, for example, by offering an additional screen. Pernilla, who teaches at both the Natural Resource Use Program and the Business and Administration Program, describes that many of the students prefer to use two screens in class. One screen for writing (usually the computer) and one for searching for information (usually the smartphone). The smartphone is also described in terms of an overused technology, causing unhealthy habits as illustrated by:

Personally, I think it’s good if the school can help ensure that students don’t have so much screen time, as there is research that shows that it can be harmful, especially in terms of how dopamine levels are affected and how it can in turn lead to depression and fatigue (Olof, Child, and Recreation Program).

Other teachers refer to the smartphone as both a tool for work, school and leisure as illustrated by “*the phone is more than a television and a chat machine/it is a professional tool*” (Victor, Heating, Ventilation and Sanitation Program). The point of view is shared by several teachers who describe the smartphone as providing a plethora of readily accessible tools for (working) life. It is used both for mundane activities and in teaching to develop profession-specific knowledge. It includes activities such as administration, calculation, ordering from the wholesaler, communicating with colleagues, etc. One teacher goes so far as to describe the smartphone not only as a tool but the most powerful one as illustrated by:

[as an electrician] your phone is the most powerful tool because then you can go to your service car and do a little Googling or call someone with better knowledge (Peter, Electricity and Energy program).

The analysis shows that there are relatively different perspectives on what constitutes the nature of the technology (Orlikowski and Gash, 1994), in this case, a smartphone. Some describe the smartphone more in technical terms and or its functionality, while others’ descriptions are rather based on which domain it belongs to, such as school, work or leisure.

Technology strategy

Teachers testify to different approaches from the management and partly make different interpretations about the motivation behind the decision to ban or restrict the smartphone or to allow it and its likely value to the organization. Several teachers describe how the management has introduced a general restriction where the point of departure is that

teachers must collect the smartphones during the lesson, However, exceptions can be made when the students need the smartphone for teaching as illustrated by:

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Our high school has a policy forbidding smartphones in class unless the teachers explicitly say that they can be used and then in connection to teaching activities//We are working on a document stating the rules of procedure that both students and parents must sign. I have prepared a box where the students should put their smartphones and they must be in silent mode (Konstantin, Vehicle and Transport Program).

He considers the policy as a way for the school to take responsibility to curb the time students spent with their smartphones. Another informant describes how the teachers are still in charge of smartphones during the lesson and that teachers choose different paths, as illustrated by:

Right now, teachers choose whether they want to collect smartphones or not. Some do, and others don't. The students themselves see no problem with their mobile use during class, which of course is for some, while others cope just fine (Cornelia, Restaurant and Food Program).

The decision can be linked to the fact that flexible solutions are the only way because teachers' problems and opportunities linked to smartphone use differs. Others express irritation, where restrictions regarding smartphone use are considered as management trying to find simple solutions to complex problems and without insight into the reality of teachers and students, as illustrated by:

It was good that you brought it [regulation of smartphones] up. We have been ordered to collect the students' phones when they arrive at lessons, I am very much against that, I want them to learn to use their phones as a tool, but I can't have that now (Lennart, Electricity and Energy Program).

or *"[the smartphone] is a work tool, so we have worked quite hard to get the principal and others to understand that we should not ban students from having smartphones in the classroom* (Victor, Heating, Ventilation and Sanitation Program)".

One informant points to how smartphone bans create inconsistency in the mission of the school and teachers, as illustrated by:

[...] now it is directed of the powers that we [teachers] should collect the phones, it will be very interesting [...] because at the same time, it is stated in the curriculum that we are to teach them how to handle digital aids, it does not hold together (Lennart, Electricity and Energy Program).

In sum, the results illustrate diversified strategies of how to handle the smartphone at the organizational level and how they are locally expressed and interpreted by teachers.

Technology in use

Cornelia, teaching at the Restaurant and Food Program, describes an unproblematic relationship to the smartphone in some of her courses as it is already excluded from her teaching on the basis of other regulations, namely, the Food Act, as illustrated by:

For my practical courses in the kitchen, I never have the problem as we have to work according to the Food Act and it says that smartphone do not belong in the kitchen because of bacteria and dirt (Cornelia, Restaurant and Food Program).

In this case, the local restriction at the school would only harmonize the professional practice. At the same time, she describes how the smartphone can be used to extend the classroom after a hectic day in school. For example, by making the students write a logbook when it suits them, as illustrated by:

They were so tired after a long day in school, so it added no value to make them stay and reflect in class, then I told them to write when it suits them, on the bus or when they get home.

Olof, at the Child and Recreation Program, describes how he tried to demonstrate how to domesticate the smartphone not least through limited use where she leads by example, as illustrated by:

I try to set an example by putting my phone away when I enter the classroom, I lay it there in the drawer to show them that I don't need to have it on me either, it's here on silent//just show that this is my phone and I put it away.

In the same manner, Helena, at the Business and Administration Program, is demonstrating what she thinks about the student's use of the smartphone when saying "It is about becoming the one fitting in [at work] [. . .] not this one [holding a pretended smartphone in her hand in front of her face]."

However, several informants describe how the smartphone is and will continue to be central to teaching. To Peter, at the Electricity and Energy Program, a smartphone is a powerful tool that students need to learn how to use in their vocation, as illustrated by "if I tell them how to use their phone to google a manual or//or a phone number to those who created this thing, they could install anything in the entire world, it is incredibly powerful really." Another way of expressing the importance of the smartphone is illustrated by Lennart at the Electricity and Energy Program:

If you are to have lighting control in a house you switch on and off with your phone, set the time, start and stop the alarm, you do everything by your phone and then you need to have one.

Victor, at the Heating, Ventilation and Sanitation Program, describes how the calendar on the phone is crucial for planning work tasks as well as creating invoice documents within the profession. He also mentions *the technician's handbook* (the plumber's bible) as an application. Rebecka, at the Health and Social Care Program, says that:

There is no better way to observe a wound heal (or not) than to take pictures of it, you can never describe that as good with words or with a text.

They give different expressions for the smartphone's central role in vocational education and see difficulties in excluding it from teaching because it already forms an integral part, as illustrated by:

Last fall it was decided that we would stop using the phones or that I would collect them [at the beginning of the lesson] [. . .] and it has been thing after thing after thing when I realize how much we use them. It must be possible to make it work, but it's quite a long journey to get there because we must rebuild the way we think (Peter, Electricity and Energy Program).

Andreas, at the Electricity and Energy Program, described that he refrains from collecting smartphones. He believes that teaching includes both learnings use and refraining from use, which is illustrated by:

I choose to consider mobile use as a learning opportunity where I, as a teacher, can point out how I and the industry view mobile use that has nothing to do with work. So not good. At the same time, the smartphone is a digital aid with lots of available information, a camera for documentation, etc.

Also, Rebecka, at the Health and Social Care Program, expresses that the use of the smartphone is necessary to reflect the reality that the students are expected to face. To ban the smartphone would create a greater gap between school and professional life than is necessary or desirable, as illustrated by:

We can't just say you can't have your smartphone because then they come out [in professional life] and then the employer says they need their smartphone, it becomes a bit odd.

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In summary, there is an incongruence regarding how teachers interpret the nature of the smartphone, the smartphone strategy and the smartphone in use.

Discussion

The smartphone constitutes a controversial and disputed technology in teaching practice (Grigic Magnusson, 2022; Leino Lindell, 2018; Ott, 2017). From a technical perspective, the smartphone has many overlapping affordances with the laptop, and some teachers relate to the smartphone as a portable computer, i.e. practical for a craftsman or an assistant nurse to carry around and use. However, the smartphone is also often considered as a private matter and a risk. This could partly be related to the fact that smartphones are not provided by the school (Ott, 2017). It could also be related to values that originate from risks of addiction (Bagci and Peksen, 2018; Chen *et al.*, 2011; Yildiz and Alkan, 2019), cheating and bullying (Callan and Johnston, 2022; Leino Lindell, 2018; Ott, 2017) or risks related to security in workplaces (Asplund and Kontio, 2020). At the same time, teachers describe major challenges in banning smartphones from teaching and emphasize the urgent need to domesticate smartphones and educate the students on how to relate to them in their current life and in their future work. This goes in line with what Langseth and Sedal (2019) refer to as a need for teachers to meet the challenges and make the most of smartphones in the process. This incongruence among the group of teachers corresponds with previous research on teacher attitudes to digital technology and how it, in general, is affecting the use of technology in teaching (Ollinen, 2019; Scherer *et al.*, 2018; Tondeur *et al.*, 2017). Furthermore, an incongruence is reflected also at an organizational level, where school principals have different strategies and rules regarding how the smartphone should be addressed in teaching. It means that different schools and different vocational programs must relate to different rules of a procedure just by being a part of a specific organization. The smartphone ban creates difficulties in terms of compliance in practice, and there is a discrepancy between the decision and the justification for smartphone bans on the one hand and teachers' perspectives and working methods on the other. The ban is seen as a lacking understanding of teachers work and teaching practice, where the Smartphone constitutes a powerful tool for a variety of activities related to teaching and learning vocational tasks. Technological frames are not static; instead, they are changeable, and context-bound. Thus, smartphones in vocational teaching need to be seen in the light of the digitalization of schools in general, which is both characterized by a technological push and attempts being made to "tame" technology. When the technological frames differ significantly between different key actors within an organization, difficulties and conflicts arise connected to the development and use of the technology (Orlikowski and Gash, 1994). This indicates that the smartphone, after the change in the education act, will continue to give rise to conflicts and tension in teaching.

Conclusions

In this study, we have explored how vocational teachers approach smartphones using technological frames and show incongruence in how teachers understand, interpret and relate to the smartphone in vocational teaching. Contributions include using technological frames to explore how restrictions of Smartphones are interpreted and understood by vocational teachers. The results could be of interest to researchers as well as to teachers, school leaders and policymakers.

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