

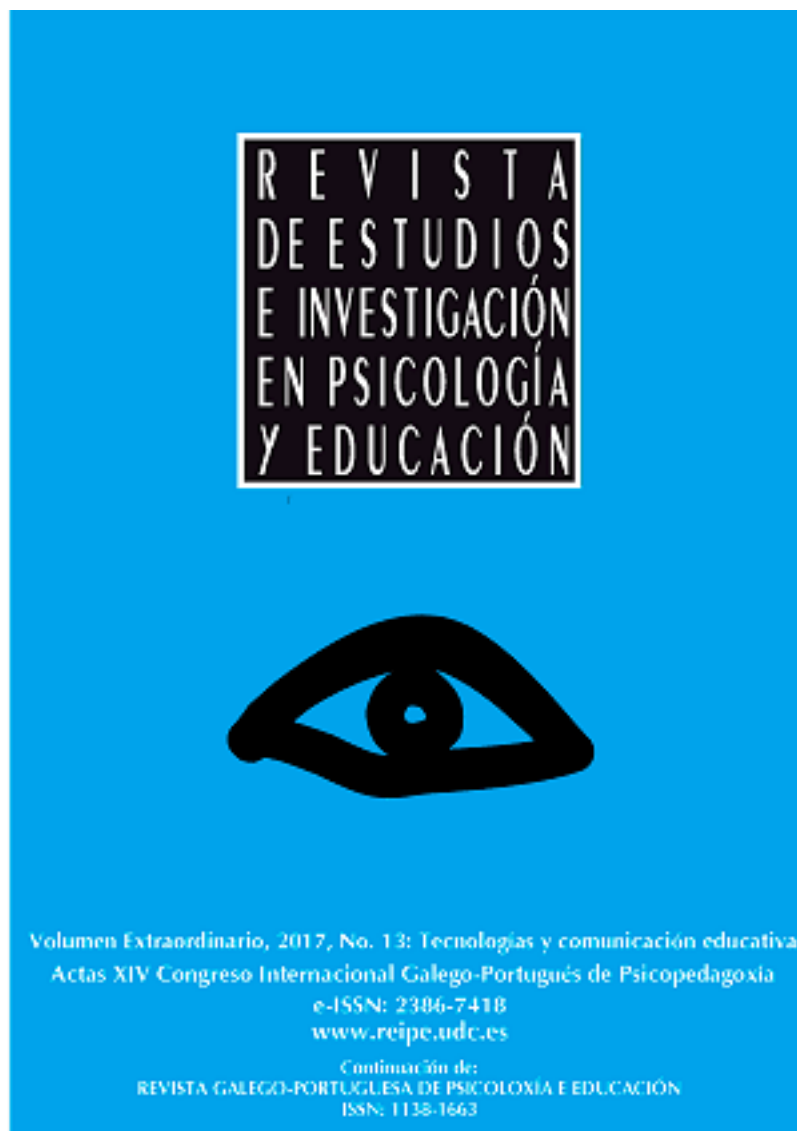
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# Challenges of mobile learning – a comparative study on use of mobile devices in six European schools: Italy, Greece, Poland, Portugal, Romania and Turkey

## Desafios do mobile learning – estudo comparativo sobre a utilização de dispositivos móveis em seis escolas europeias: Itália, Grécia, Polónia, Portugal, Roménia, Turquia

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### Abstract

Although mobile technology is not yet widely used in schools, and in some cases even prohibited by internal regulations, the truth is that this technology, besides being a hallmark of contemporary life, is a powerful tool that challenges teachers and students to innovate in teaching learning practices. This article intends to contribute to the understanding of this phenomenon. The article is part of a project called "Bringing life into the classroom: innovative use of mobile devices in the educational process" (BLIC & CLIC), which aims to diagnose the use of mobile devices in the educational context for the development of digital skills by students and school teachers. This diagnosis will be the first "output" of the project, and the results will allow the (re)design of the future interventions that will respond to the general objectives of the project.

*Keywords:* mobile learning, pedagogical innovation; advantages and disadvantages

### Resumo

Embora a tecnologia móvel não seja, ainda, um dispositivo utilizado com muita frequência nas escolas, sendo em algumas até proibido por regulamentos internos, a verdade é que esta tecnologia, para além de ser condição de marca da vida contemporânea, é uma ferramenta poderosa que desafia os professores e os alunos a inovar nas práticas de ensino aprendizagem. Com este artigo pretende-se dar um contributo para a compreensão deste fenómeno. O artigo surge no âmbito de um projeto, denominado "Bringing life into the classroom: innovative use of mobile devices in the educational process" (BLIC&CLIC), tendo como objetivo efetuar uma análise diagnóstica sobre o uso de dispositivos móveis em contexto educativo para o desenvolvimento de competências digitais por estudantes e professores de escolas. Este diagnóstico será o primeiro "output" do projeto, devendo os resultados permitir o (re) desenho das futuras intervenções que responderão aos objetivos gerais do projeto.

*Palavras-chave:* mobile learning, inovação educativa; vantagens e desvantagens

### Introduction

Schools are crowded with smartphones and tablets continuously connected to the internet. The popularity of

these devices among the newest generation of students has increased so much that teachers feel the challenge to innovate teaching by integrating mobile technologies into the pedagogical designs they propose. This necessity of developing a mobile online environment allows the mobile learning (Lencastre, Bento, & Magalhães, 2016). Mobile learning meets the needs of today's students, who want to use the tools they use outside of class for learning inside. Mobile learning is defined as learning across multiple contexts, through social and content interactions, using personal electronic devices (Crompton, 2015). This definition makes it clear how mobile technologies can extend the learning spaces, not limited anymore by regular or specific classroom hours, but by learning and pedagogical pluralism (Pachler, Bachmair, & Cook, 2010). With mobile technologies, students can learn both in the formal classroom and outside of school context. This gives the student the opportunity to learn autonomously and intuitively by combining formal and informal learning processes (Trentin, & Repetto, 2013). Mobile learning provides an active, participatory, motivated and personalised student experience, distinguishing modes of communication, collaboration, and interaction with information (Sharples, 2013); empowering ubiquitous learning, networking, and lifelong learning. All this flexibility requires the teacher's openness to perform new roles in the teaching and learning processes using active and participative methodologies (Attewell, & Savill-Smith, 2014).

This article presents a comparative study on mobile learning using the data collected in the scope of the project 'Bringing life into the classroom: innovative use of mobile devices in the educational process' ([www.bliclic.com](http://www.bliclic.com)). This project, funded by the Romanian Agency for Erasmus plus (ANPCDEFP), addresses the use of mobile devices in educational context for the development of digital skills in students and teachers from six European schools: Colegiul Tehnic Edmond Nicolau Focsani (Romania), IS M. Filetico

(Italy), 1st Lyceum of Rhodes – Venetokleio (Greece), Zespol Szkol im. por. Jozefa Sarny w Gorzycach (Poland), Agrupamento de Escolas da Maia (Portugal), Toki Halkali Anadolu Imam Hatip Lisesi (Turkey).

Based on the data collected in these schools, it is sought to know the uses of mobile devices in educational context from the perspective of the teachers questioned, namely, (i) to identify the teachers' competencies on mobile learning, (ii) to understand the pedagogical use of mobile technologies, and (iii) to understand the teachers' opinions on the use of mobile devices. This diagnosis will be used to design future interventions within this European project.

The article is organised as follows: Section 2 describes the method used for this study; Section 3 reports and discusses the results under three topics: teachers' competencies on mobile learning, pedagogical use of mobile technologies, advantages and disadvantages of using mobile phones in class. The final section concludes and provides recommendations for further research on mobile devices.

### Methodology

We used the survey research method. Data collected through an online questionnaire, based on a questionnaire designed to diagnose the use of mobile technologies in the teaching and learning of a foreign language (english) (Lobato & Peter, 2012). The survey was self-administered to teachers of all levels at the schools participating in the project, from the six partner countries. The questionnaire was set with four general objectives: (i) to survey the project teachers' views about the importance of mobile technologies in an educational context; (ii) diagnosing the digital skills of teachers; (iii) collect the opinion of teachers regarding the use of mobile devices in an educational context; and (iv) to analyze the opinions of teachers in regard to the advantages and disadvantages of using mobile technologies in schools. The questionnaire consisted of seventeen closed questions and two open questions, taking an average of approximately 20 minutes to fill.

The questionnaire was validated based on the premise that the data collection is a process that ensures that what you want to collect serves the purpose of the study, as referred by De Ketele and Roegiers (1993). With the definition of the type of questionnaire, the variables and analysis of other previously tested questionnaire was completed. Thereafter, the questionnaire was prepared for a pilot study, which resulted in a detailed analysis of the initial release and further construction of the final version.

As such, in the original questionnaire (Lobato & Peter, 2012), there were 20 questions, of which 14 were kept unchanged, while 6 were adapted. After adapting the Portuguese version, a link was sent to 5 teachers similar to the target audience, (2 at Agrupamento de Escolas Gonçalo Mendes da Maia - English and Mathematics; 1 at Agrupamento de Escolas Castêlo da Maia - Portuguese; 2 at Agrupamento de Escolas Coronado e Castro - Portuguese), together with the following 9

questions that should be answered after the questionnaire was completed:

1. How long did it take complete the questionnaire?
2. The instructions were clear?
3. Did you found any ambiguous question? If so, what and why?
4. The list of closed questions covers all the options?
5. Does any question influence the answer?
6. Did you deny to answer any questions?
7. In your opinion, was any important topic omitted?
8. Did you considered the format of the questionnaire clear/attractive?
9. Would you like to add any comments?

After receiving the 5 responses of the teachers who participated in the pilot, we made the following changes:

Correction of questions 5 and 6, to allow simultaneous options; adaptation of the Likert scale, reducing to 5 answer options, in response to statements (questions 7 to 16), because teachers felt there were too many options and confusing ones: "very confusing decision", "too many answer choices that make it confusing to answer"; elimination of question 18 ("Today it is impossible to live without a mobile phone and therefore also at school he should be used"), as teachers felt it repeated the previous question; spelling correction of the last question (19).

The final version of the questionnaire ([goo.gl/cD9Q3p](http://goo.gl/cD9Q3p)) was translated into seven languages (english - the official language of the project, romanian, polish, italian, turkish, greek and portuguese), so that data could be collected among teaching staff of each participating school. As such, a convenience sampling was employed, consisting of teachers of schools that are part of the project.

The questionnaire was sent to project coordinators in each country, on March 1, 2017, with the deadline for submission of responses to 30 March 2017. However, as at March 30, 2017, as there was a small number of answers, a new deadline was proposed, 31 April, and a request was sent to the coordinator of the project (Petronia Moraru) to alert the partners. The questionnaire was sent via email to a total of 484 teachers, having obtained 220 answers (45.5%) which constitute the sampling from which data was produced. Data collection took place in March and April of this year (2017).

Data from Likert scale questions (7-16) was analysed using JASP 8.2. Analyses performed include frequency analysis and crosstabs contingency tables. Cronbach's alpha was used as a measure of the internal consistency of these items in the questionnaire. Alpha was 0.713, indicating a reasonable level of consistency.

Data from open questions (17, 18) was submitted to qualitative analysis based on the techniques suggested by grounded theory (Strauss & Corbin, 1990) with the support of NVivo11 software. In each question, the first step of the analysis was "open coding - the process of segmenting the data, examine them, compare them, conceptualise them and categorize them" (Strauss & Corbin, 1990, pp 60-61). We considered as unit of analysis the "text blocks that reflect a particular topic" and which "can be a sentence or two pages" (Ryan & Bernard, 2000, p. 782). For coding purposes in NVivo, these basic units of analysis were defined through free text selection.

In the case of question 17, related to the advantages of using mobile phones in the classroom, this process resulted in 14 categories. Afterwards, these categories were integrated into four conceptually higher categories: *Cognitive aspects; socio-afective aspects; methodological aspects; other aspects*. This is the axial coding (Strauss & Corbin, 1990), aiming to restructure the data already coded through open coding.

Question 18, regarding the disadvantages of using mobile phones in the classroom, 11 categories were identified in the open coding phase. These were organized, in the axial coding phase, into four categories: *cognitive aspects; socio-affective aspects; ethical aspects; other aspects*. The category *health aspects* maintained the open coding.

After examining the corpus, questioning and display functions were applied, which favours the understanding of the analysis. In this paper, we refer to frequency words (Figure 8 and Figure 9), charts of search words, and models (*vide* [goo.gl/G5WtYN](http://goo.gl/G5WtYN)). Given the space limitations, we do not explore the interpretation of each of the figures presented, work that we will be presenting in a future publication.

**Results**

Teachers that participated in this study are in the majority women (Table 1) and predominantly between 36 and 54 (Table 2). Regarding country of origin, Portugal has the higher number of respondents (64) and Greece the lower (22) (Table 1).

Table 1. *Frequencies for gender*

Country	n	%	Female	Male
Greece	22	10.0	7	15
Italy	26	11.8	20	6
Poland	30	13.6	10	20
Romania	23	10.5	14	9
Turkey	55	25.0	34	21
Portugal	64	29.1	48	16
Total	220	100.0	133	87

Table 2. *Frequencies for age*

Age	%	n	GR	IT	PL	RO	TK	PT
22-25	1,4	3	0	0	1	0	2	0
26-35	14,1	31	0	3	3	0	25	0
36-45	28,2	62	1	6	10	6	22	17
45-54	35,5	78	16	9	13	9	6	25
55 or >	20,9	46	5	8	3	8	0	22
Total	100	220	22	26	30	23	55	64

GR-Greece; IT-Italy; PL-Poland; RO-Romania; TK-Turkey; PT-Portugal

Mobile phone and laptop clearly dominate the mobile devices owned (Figure 1). On a country basis, larger differences come up in relation to personal laptops (from Italy with 26,9% to Romania with 100%). Portugal is the country where fewer teachers report having their own mobile phone (54,7%) and Romania the highest (100%) (Figure 2). It is relevant to notice that Romania (n=23) has a third of Portugal's respondents (n=64), but within the same age ranges (from 36 to 55 and more) (Table 2).

None of the other devices goes above 40%, iPad being the closest to this value, in Greece and Italy (36,4% and 34,6%, respectively). Finally, it is worth noting that Portugal reports a 23,4% of other devices, which are not identified (Figure 2).

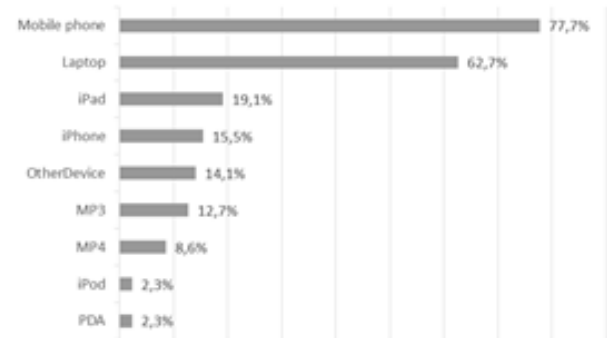


Figure 1 - Mobile devices owned (n=220)

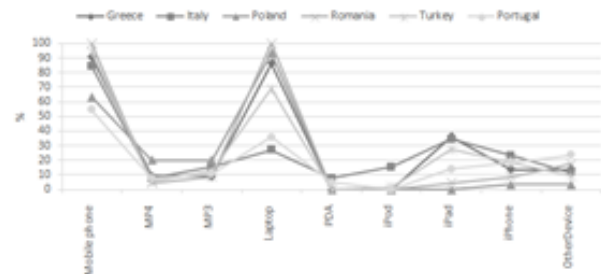


Figure 2 - Mobile devices owned by country

Generally, teachers (83%) report already using mobile phones to communicate with colleagues about school (Q8) and manage work tasks (Q9). Slightly lower is the number of teachers that use it to save relevant documents (Q10) (59,6%) (Figure 3). In this respect, there are no significant differences between countries (*Figure ii* [goo.gl/G5WtYN](http://goo.gl/G5WtYN)).

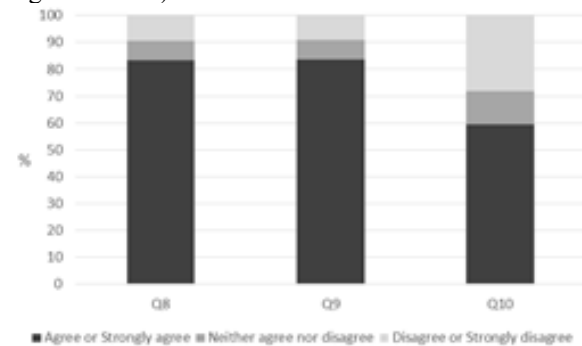


Figure 3 - Mobile phone features used

**Pedagogical use of mobile technologies**

Most of the teachers in this study see pedagogical potential in the use of mobile devices in the classroom. More than 60% 'agree' or 'strongly agree' with statements such as 'mobile phone is a personal device that should be used in school' (Q11); 'mobile devices could be used in school activities' (Q12); 'I see mobile devices as a pedagogical resource that should be explored' (Q13). Of the issues that sought to measure this indicator, only Q16 ('nowadays it is impossible to live

without a mobile phone, and therefore also in the school it should be used’) generates more doubts, with almost a third of teachers disagreeing or strongly disagreeing with this statement.

Romania and Poland is where the belief that mobile devices afford pedagogical opportunities is stronger and Italy where it is weaker. All these 4 variables register values above 80% for ‘agree’ and ‘strongly agree’ options in Romania and above 70% in Poland. In Italy, with the exception of Q12 (65,3%), the number of teachers agreeing or strongly agreeing with the other sentences stops at 46% (Figure ii - [goo.gl/G5WtYN](http://goo.gl/G5WtYN)).

Data shows a significantly different image when it comes to assessing if teachers already take advantages of the potential mobile devices may bring to classroom. Romania and Poland maintain higher figures, above 80%. Greece and Turkey are the only cases where the ‘disagree’ or ‘strongly disagree’ options are the highest (Figure 5). When asked about mobile devices in class being a distractor, Turkish teachers stand out (Figure 7). Notwithstanding, this is a less consensual issue, with the percentage of teachers that find mobile devices distracting (42,8%) close to ones considering the opposite (36,8%) and a fifth of respondents choosing neither (Figure 6 and Figure 7).

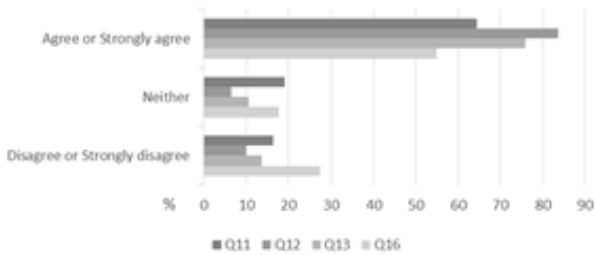


Figure 4 - Questions about pedagogical potential

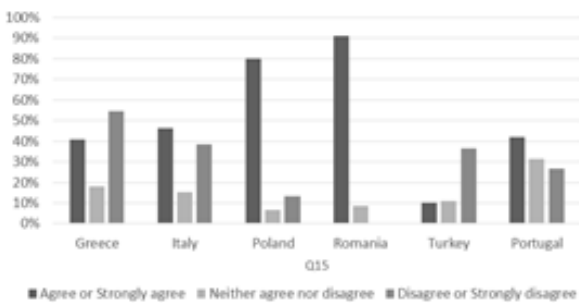


Figure 5 – Teachers that already take advantages of using mobile devices in classroom?

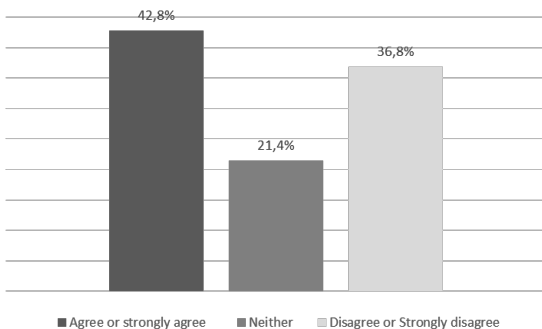


Figure 6 – A mobile phone in school distracts? (Q14)

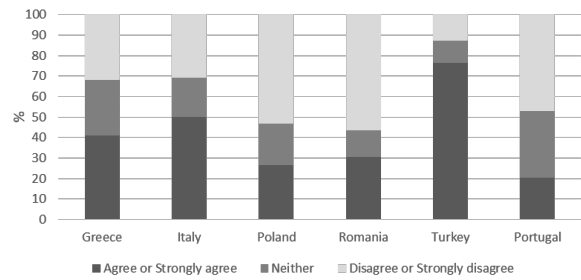


Figure 7 - Does a mobile device in class distract? Differences by country (Q14)

**Advantages and disadvantages of using mobile phones in class**



Figure 8- Word cloud “advantages of using mobiles in classroom. Own authorship

This word cloud reflects the frequency of words and allows us to situate the general ideas expressed by respondents regarding the positive aspects. We found that the words registering higher occurrence refer to information search by the students: *using* (50) *information* (35) *students* (29) *search* (21) *access* (20) *interest* (15). Indeed, among the many benefits reported by teachers, which we specify ahead, the most frequent is access to online information. A count of the number of analysis units in each category by country (Figure iii at [goo.gl/G5WtYN](http://goo.gl/G5WtYN)) shows the category *access to information* clearly highlighted. It is worth noticing that Portugal is where the idea is more frequent and Turkey the country that least refers to it.

The model resulting from the analysis of categorical data (Figure v [goo.gl/G5WtYN](http://goo.gl/G5WtYN)) presents a clearer x-ray of the data. The dimension positive aspects of mobile phone use in the classroom has four categories (*cognitive*, *socio-affective*; *methodological*; *other*) each with several subcategories obtained by the process described before. The circles refer to categories and subcategories of analysis and the lines to countries whose teachers refer them. With the exception of Turkey, which does not seem to have clear ideas about the advantages of using mobile

phones in the classroom, teachers from other countries acknowledge these advantages.



Figure 9 - Word cloud “disadvantages of using mobiles in classroom. Own authorship

In the case of the disadvantages of the use of mobile phones in the classroom, we have verified that the words of highest occurrence are those whose meaning refers to a possible distraction on the part of the students: *using* (74) *students* (62) *distraction* (56), in the forms *distract*, *distracted*, *distracting*, *distraction*, *distracts* and *distractibility*, and *attention* (25), in this case concerning lack of attention, as can be verified by the context where the word occurs. Thus, what worries most teachers seems to be the possibility that the mobile phones, in the classroom, cause the students' deconcentration and lack of attention since, they justify, it is easy to wander to areas of their personal interest that have nothing to do with schoolwork.

This idea is confirmed by the number of units of analysis (Figure iv at [goo.gl/G5WtYN](http://goo.gl/G5WtYN)), with the category *distraction* including by far the largest number of units in all countries. Following are situations related to *lack of privacy*, and *superficiality* in the work performed. It is curious to notice that, once again, Portugal has the highest number of registered units of analysis, and Turkey, which undervalued the positive aspects, reveals a greater awareness of the negative aspects.

Negative aspects of mobile phone use in the classroom present five categories (*ethical; cognitive; socio-affective; health; other*), four of which have several subcategories (Figure vi at [goo.gl/G5WtYN](http://goo.gl/G5WtYN)). Our analysis shows that ethical issues are a concern among teachers of all countries as well as health issues.

It should be noted that teachers in Turkey refer to most of the negative aspects identified by the six countries and even when asked about the positive aspects, they refer to the negatives. Perhaps Turkey is still in an early stage of using mobile phones in the classroom, which, like any other innovation, is initially seen more as a threat than an advantage.

## Concluding remarks

This study was conducted with the participation of 220 teachers, from elementary to secondary school levels, as well as vocational, in the six countries participating in the Blic&Clic project. The analysis performed shows a high level of motivation to the use of mobile devices as a pedagogical resource in the classroom. Romania and Poland are the countries where most teachers find this appealing, while Italy registers lower numbers. The possibility to easily access information is what teachers value most.

Nonetheless, actual use of these tools in classes is significantly lower and unequal between the different countries. Greece and Turkey actually present higher figures for those who don't use mobile technologies in classroom. Romania and Poland is where more teachers report already taking these advantages. Both statistical and qualitative analysis present strong evidence that teachers are worried about mobile phone leading to distractions that disturb classroom work. In our analysis of negative aspects, this category contains by far the largest number of units in all countries.

Further research should explore in more depth what explains the gap between teachers' enthusiasm and the actual integration of mobile devices in school. While it is certain that some schools, or even national legislation, prohibit these devices in classroom, our data points to other sorts of difficulties. This is particularly the case for distractions, but also for ethical and health issues. Given the differences between these countries, future work should identify what distinguishes the ones that seem more comfortable and confident to actually bring mobile devices to class.

## Acknowledgments

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