Using Digital Platforms in Schools for Prevention and Health Promotion: A Scoping Review

Christian Dagenais, PhD
Michelle Proulx, PhD
Esther Mc Sween-Cadieux, PhD

Objective: Digital platforms for prevention and health promotion (PHP) are now, more than ever, available for use by school professionals, including teachers. However, little is known about what motivates them to use such platforms. A scoping review (ScR) was conducted to identify conditions that promote use by school professionals, including teachers, of PHP digital platforms at schools. **Methods:** For our ScR, we accessed ERIC, Sociological Abstracts, MEDLINE, PubMed, and Web of Science databases (period 2000-2018) in 3 sectors: education, health, online technologies. For each study, we prepared and validated a summary sheet. Contents dealing with conditions for use were subjected to open coding, grouped into categories, and synthesized. **Results:** Of the 3639 articles captured, 17 studies were selected. Five conditions emerged: (1) ensuring that the digital platform becomes a reference for PHP activity in schools; (2) that the resources needed for its uptake are mobilized; (3) that it is user-friendly; (4) that the digital platform engages the participation of everyone involved; and (5) that it is linked to existing programs in the school. **Conclusion:** These results can guide the activities deployed in schools for optimal implementation of PHP programs from digital platforms.

The close link between health and academic success is now a matter of consensus. Healthy lifestyles are associated with students' cognitive development, learning capacity, attention span, and academic performance in core subjects.[1-4] A school climate that fosters emotional security and positive interpersonal relationships enables students to make responsible choices in prevention and health promotion associated with academic success.[5-7]

Public health and education stakeholders are increasingly aware of this issue. They have formed alliances to support the development, well-being, and academic success of young people through different prevention and health promotion initiatives.[8] These initiatives, eg, involving teachers in planning activities, video games, and other educational resources made available to students, have focused on many issues, including the promotion of healthy lifestyles, eg, nutrition, physical activity, and social skills, appropriate stress management, and positive mental health, to name a few.[9-13] The beneficial effects of these initiatives have been shown, particularly when they are aimed at making the school a healthy living environment where educational and pedagogical objectives are based on a set of preventive and health promotion measures.[8]

More than ever, information and communication technologies (ICTs) occupy an important place in schools, contributing to the achievement of educational and health objectives.[14-16] ICTs have become recognized as a means of facilitating and

Christian Dagenais, University of Montreal, Department of Psychology. Montreal, QC, Canada. Michelle Proulx, University of Montreal, Department of Psychology. Montreal, QC, Canada. Esther Mc Sween-Cadieux, University of Montreal, Department of Psychology. Montreal, QC, Canada. Correspondence to Dr Dagenais; Christian.dagenais@umontreal.ca

energizing knowledge transmission and application in school settings. These technologies enable professionals, including teachers, to share knowledge among colleagues and to transmit content in interactive formats that support independent learning among young people. They have rapid access to information at low cost.[15,17,18] However, the uptake and use of ICTs pose many challenges in school settings and require systematic consideration and planning.[19] Efforts must be made to implement proven practices using effective change strategies.[20]

To learn more about conditions that could facilitate the uptake and use by school professionals of digital platforms for prevention and health promotion (PHP) in schools, a systematic review in the form of a scoping review (ScR) was needed.[21,22] More specifically, the objective of the ScR was to identify conditions for the use of PHP digital platforms by teachers and other professionals at the preschool, primary, and secondary levels of public and private school networks.

The results of this ScR will be useful for guiding the activities to be undertaken by teachers and other professionals for optimal implementation of school-based PHP programs using ICTs. They will, as such, have a positive impact on the health, well-being, and academic success of young people.

METHODS

The ScR method was adopted because it is well-suited to the examination of emerging fields of study for which the body of knowledge is still limited. The method is generally defined as a mapping or exploration of the available evidence around a broad study object and from various sources such as empirical studies, secondary data from quantitative, qualitative, or mixed-method primary studies, grey literature. Mainly exploratory in nature and flexible in approach, while being rigorous, it involves discerning the boundaries between diverse bodies of evidence, by describing their nature, characteristics, volume, and/or depth.[21,23,24] An ScR differs from a Cochrane systematic review, for example, in that the decision to include or exclude a study is based not on methodological criteria, but rather on content relevance.[21,22] It is conducted in stages, as set out originally by Arksey and O'Malley[21] corresponding to a series of operations and systematic ways of proceeding.

The aim of this ScR was to identify the extent and nature of, and gaps in current knowledge regarding conditions that promote the use of PHP digital platforms by teachers and other professionals at the preschool, primary, and secondary levels of public and private school networks.

It was prepared by the principal researcher (CD), a research professional (MP), and a database manager, using a sustained iterative process (PRISMA) to ensure complete coverage of the literature (Figure 1). The review was conducted in 7 stages: (1) identifying the research question; (2) identifying relevant studies; (3) choosing the criteria for study selection; (4) applying the criteria for study selection; (5) charting the data; (6) summarizing the results; and (7) reporting the results.

Identification of Relevant Studies

The digital searches (Appendix 1) covered the period 2000 to 2018 to capture the most recent initiatives relating to PHP based on a digital platform. Reference databases in education and health were consulted, including ERIC, Sociological Abstracts, MEDLINE, PubMed, and Web of Science. Searches were based on keywords in 3 broad sectors: education, health, and online technologies (for example: educational activity, adolescent health, e-Health). First, general searches were done to find relevant articles, from which concepts and keywords were identified. The approach was then progressively refined following an iterative process, eg, redefinition of keywords, selection of new descriptors, as trials were carried out in the chosen databases with the assistance of the database manager, in close collaboration with team members. The digital searches were entered in the free and open-source bibliographic data management software Zotero to be accessible to members of the research team.

Choice of Study Selection Criteria

The articles selected concerned only empirical studies on PHP projects that documented the conditions for use of digital platforms by teachers and other professionals at the preschool, primary, and secondary levels of public and private networks. Only studies dealing with use of platforms hosting educational content for PHP programs were eligible. Both unfavorable and favorable conditions for use were examined, to obtain a nuanced picture

of what is likely to favor use. Content that focused on the impacts of using PHP digital platforms was excluded. Only studies in English or French were selected to ensure that data were collected from relatively similar school environments in terms of school organization and governance. The low- and middle-income countries were excluded due to significant differences in Internet access and because the content of the digital platforms studied was not relevant to those students' situations. The grey literature was not consulted because we wanted to focus on what was published internationally, in peer review journals, regardless of the characteristics and specific contexts of the countries where these publications emerged.

Application of Study Selection Criteria

The research professional (MP) and the principal researcher (CD) first classified the studies in Zotero as either relevant (YES) or irrelevant (NO) based on examination of titles and abstracts which considerably reduced the number of references retained. They then conducted an *iterative* and *independent* review of the remaining documents, compare their selections, and rework or refine their inclusion and exclusion criteria, which gradually become defined and substantiated.[22] As necessary, the entire article was reviewed.

Charting the Data

We used a *descriptive-analytical* method[21] for charting the data. The method consists of applying a common analytical framework to extract key information from all the documents under review, from which a data extraction form was gradually assembled. The form was developed collaboratively between the principal investigator (CD) and research professional (MP) to be able to determine and define as clearly as possible the variables of interest and the data to be extracted based on the research question. It described the targeted problem, the objective of the study, its methods, and the conditions (positive and negative) relating to the use of digital platforms. The researcher professional tests the form on 5 documents to ensure that the data extraction was well aligned with the research objective and questions and that all the variables of interest were covered by the extractions.[22] Discussions have taken place regularly with the principal

researcher to get along well on the way to perform the data extraction and the nature of the data that had to be recorded in the form. The research professional conducted several reviews of the studies to ensure the rigor of the data collection.

Summarizing and Reporting Results

Contents dealing with conditions for use were subjected to open coding and then grouped into categories and synthesized.[25,26] The formulation of the narrative was supported by comparisons within the data and the identification of contradictory evidence. The results were presented in a narrative and tabular format. Analysis of the results identified 5 conditions for the use of PHP digital platforms in schools, which are presented in the following section.

RESULTS
Description of Studies Selected

The digital searches initially identified 4342 articles, from which 703 duplicates were removed, leaving 3639 articles. Following the first reviewer's (MP) screening of these 3639 references for eligibility, a smaller bank of 113 articles was created. In a second step, these 113 articles were screened independently by 2 reviewers (CD, MP) and discussed to reach consensus on the articles to be included; ultimately 17 studies were selected (Figure 1). These were conducted between 2008 and 2018, with half between 2015 and 2018. They were carried out in the United States (7), the United Kingdom (3), the Netherlands (2), Finland (2), Australia (1), and Portugal (1), and one (1) in several countries. The selected studies concerned digital platforms addressing several health issues: sexual health (6); overweight/obesity (2); nutrition/eating (2); mental health (2); alcohol and drug use (2); education on appropriate use of medicines (1); oral health (1); infection prevention and appropriate use of antibiotics and vaccines (1). Most of the data extracted from these studies was intended for teachers only (11/17). The others involved teachers and other persons from the staff and/or community (eg, administrators, school nurses, catering managers, guidance counselors).

The extracted data came from qualitative (8), quantitative non-randomized (3), quantitative randomized (1), quantitative descriptive (4), and mixed (1) study designs identifying conditions for

Figure 1
PRISMA Flow Diagram
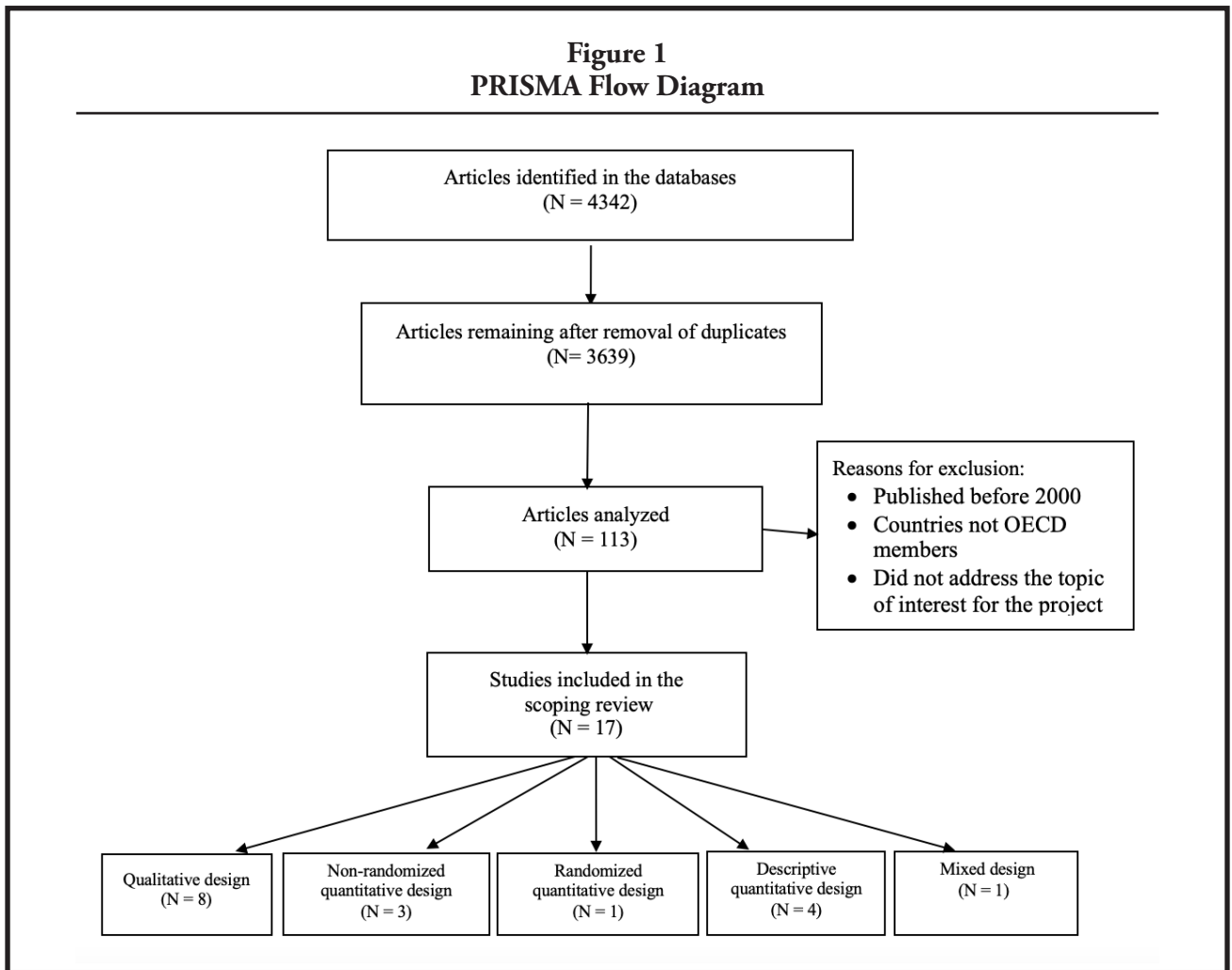
the use of digital platforms either already developed or under development by teachers and other professionals. The methods for the studies looking at development tended to be cursory and aimed at modifying the processes around technology use. The methods for studies where the digital platform had already been developed presented varying degrees of rigor. However, all studies in the review provided relevant content on the conditions for use of PHP digital platforms by teachers and other professionals in school settings. No discrepancies were observed in conditions for use according to type of study design. Table 1 summarizes the designs of the 17 studies reviewed.[15,16,18,27-40]

Conditions for Use of Digital Platforms.

Five main conditions emerged from the studies included in the review that were favorable or un-favorable to the use of digital platforms by teachers and other school professionals at the preschool, primary, and secondary levels of public and private school networks. Extracts taken from studies in the review support these results as well as a summary table of favorable and unfavorable conditions for use for all the studies retained in the review. Table 2 summarizes the 17 studies reviewed.

That the PHP program's online platform becomes a reference in the school. This condition was reported in 16 of the 17 studies. It refers to actions taken in schools to ensure that a PHP program's digital platform becomes a benchmark and a tool of choice for professionals. The studies showed that opinions about the content, positive or negative, determine whether and how it is used. Furthermore, a platform's potential to provide up-to-date, evidence-based content, in language that is appro-

Table 1
Description of Source Studies and Designs of Data
Extracted Regarding Teachers and Other Professionals

Selected articles	Description of source studies	Data extracted – teachers and other professionals
Digital platforms already developed		
15	Action research (sample: teachers, nurses, school catering managers)	Semi-structured interviews (teachers, nurses, school catering managers; N = 16)
16	Qualitative study (sample: teachers and students)	Semi-structured interviews (teachers; N = 4)
18	Non-randomized quantitative study (sample: teachers)	Pre/post questionnaires (teachers; N, Time 1 = 41; Time 2 = 54)
27	Qualitative study (sample: students and teachers)	Semi-structured interviews (teachers; N = 3)
28	Quantitative descriptive study (sample: teachers)	Online questionnaires (teachers; N = 695)
29	Non-randomized quantitative study (sample: nurses, program coordinators, library resource specialists, parents, health educators, teachers, students)	Pre/post questionnaires (nurses, program coordinators, library resource specialists, parents, health educators, teachers; N, Time 1 = 28, Time 2 = 14)
30	Non-randomized quantitative study (sample: teachers, administrators, community organizations personnel)	Pre/post questionnaires (teachers, administrators, community organizations personnel; N, Time 1 = 16; Time 2 = 16)
31	Quantitative descriptive study (sample: teachers and guidance counselors)	Online questionnaires (teachers and guidance counselors; N = 44)
32	Mixed study (sample: teachers, guidance counselors, students)	Pre/post questionnaires (teachers and guidance counselors; N, Time 1 = 48; Time 2 = 39) Semi-structured interviews (teachers and guidance counselors; N = 15)
33	Randomized trial (sample: nurses)	Experimental/control groups (nurses; N = 526)
34	Qualitative study (sample: teachers and students)	Semi-structured interviews and focus groups (teachers; N = 16)
35	Qualitative study (multisite case study) (sample: project coordinators, teachers, students)	Semi-structured interviews (teachers; N = 36)
36	Mixed study (sample: teachers and students)	Semi-structured interviews (teachers; N = 8)
Digital platforms under development		
37	Description of online platform development; qualitative study (sample: teachers)	Focus groups (teachers; N = 14)
38	Description of online platform development; mixed study (sample: teachers, health professionals, students)	Post-use questionnaires and focus groups (teachers; N = 10)
39	Description of online platform development; quantitative study (sample: teachers and students)	Online questionnaires with open-ended questions (teachers; N = 26)
40	Description of online platform development; qualitative study (sample: teachers)	Semi-structured interviews (teachers; N = 15)

priate and understandable, as well as beneficial to students, appears to encourage its use.

Most teachers thought the language in the scripts was suitable and comprehensible for Year 8 students.[37] All respondents perceived the information they received from iCHAMPSS as accurate and trustworthy.[29] Apart from up-to-date information, the ICT-based learning environment supported the pupils' independent, spontaneous nutrition health learning process, as told by one teacher.[15]

To become a reference in PHP programs, a digital platform also must offer advantages over other tools available in the school. It must add value by being useful, requiring little effort and time, and having a positive impact on both the professional and the student. In some studies, digital platform use appeared to have been motivated by professionals' need to transmit a PHP program's content with greater rigor, or by a need for knowledge. For example, it appeared that a PHP digital platform was appealing to professionals when it provided them with material that was new (and sometimes free), improved, or not yet sufficiently covered in the school. Some were intrigued by the unfamiliar content of a platform; they wanted to learn about it so they could share it with their students and answer their questions. A platform's use also appeared to be fostered when it enabled professionals to fill gaps in their PHP program instruction, provided quick access to more sources of information, and promoted effective delivery of educational activities.

That resources are invested to ensure uptake of a PHP program's online platform. This condition was highlighted in 13 studies. It refers to various forms of support provided for using a PHP digital platform. However, in most studies, these supports were problematic. The problems had to do with facilities, such as not enough computers in classrooms, difficulties in reserving computer rooms, and poor online access, including the blocking of content on sexuality and the presence of firewalls. Other difficulties were sometimes related to the dissemination and promotion of the resource itself. Use also appeared to be constrained by difficult classroom environments, incompatible schedules between students and teachers, staff turnover, or workload. Lack of funding was sometimes mentioned. Ultimately, overloaded time-schedules, lack of technical and financial resources, and logistical issues were identified among the main obstacles.[16]

School staff members described the ICT-based learning environment as suitable, but the facilities themselves as a weakness in the schools.

The ICT-based learning environment was evaluated as requiring well-functioning classrooms with enough computers having telecommunications connections.[15] Only 21% had adequate computers for students' health education, which may have limited current use of health-related

software (64%) and Internet (28%) for health lessons.[28]

Another crucial factor is time spent in use. Time is precious when the number of teaching hours is limited. Considerable effort, and thus, time, is needed to adapt to using the platform, as it involves changes in practice, including a new role in assisting students. When successful, however, using the resource saved time, as less was required to plan course materials and more was freed up for planning teaching activities.

Lack of time and time pressure to work on the project while working through the current curriculum was a major complain among teachers.[16] Although featured in one project in particular,[33] the time constrains were seen as a general problem.

The importance of training was raised in more than one-fourth of the studies, particularly for integrating a platform's content and developing professional skills for planning and implementing projects. Some studies described training needs related to using computers or becoming familiar with a platform's content. Some suggested that attention should be paid to the pedagogical component of a PHP digital platform and that users needed to be trained for the new learning environment. Training was facilitated when delivered in an entertaining manner, eg, using comic strips or cartoons, for instance.

Adoption of the pedagogical principles of an ICT-based learning environment required the school staffs to internalize the ICT-based learning environment and use.[15]

That the PHP program's online platform is user-friendly. This condition was identified by 13 studies. These studies all demonstrated the importance of having a technology that is easy to use and navigate and has readily accessible content, eg, enables targeted searches, or simple structure. The asynchronous nature of a platform, eg, allowing access to content not limited to fixed periods of time, was appreciated, as were its functionalities, which made it possible to perform simple and personalized information searches. To this were added colorful and attractive design, and appropriate and understandable language.

Most teachers enjoyed the interactive and novel delivery of the program and found it a stimulating and exciting way to learn.[37]

Table 2

Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
15	To investigate the views of school staff on a nutrition health project implemented via an ICT-based learning environment in a secondary school (7th-9th grades).	Healthy nutrition	• Flexible resource that supported curiosity • Facilitated search for up-to-date information • Allowed for personalized and targeted searches • Confidence in the accuracy of information • Increased student motivation and interest, as learning was not constrained by place or time • Parents also able to familiarize themselves with the content • Supportive of students' independent learning • Flexible use not tied to a physical space or specific time	• Required adoption of new pedagogical principles: new learning environment required internalizing alternative teaching methods (eg, problem-based learning) • Importance of paying attention to transmission of the pedagogical component of the project (not just a matter of sharing information, but also a teaching method to be integrated into the platform's use) • Problems related to facilities (access to only one computer per class; poor telecommunications connections) • Need for computer training • Different role of teacher; less involvement, assistance role • Use required motivation and attitudinal changes compared to traditional teaching • Need for training (on role change, computer use) • Required planning, especially at the beginning, demanded a lot of effort • Required more time for planning and collaboration with colleagues
16	To examine teachers' experiences with and opinion on a web-based, cross-cultural project.	Alcohol use	• Attractive and intriguing resource for students, source of motivation and commitment, facilitated concentration • Allowed use of, and rapid access to, a greater number of information sources • New perspectives on teaching via cross-settings collaboration (eg, through rapid access to a variety of information, different perspectives on teaching) • Increased interaction between teachers and students and colleagues from other settings • Positive effects seen in students (eg, working at their own pace autonomously; development of personal skills)	• Difficulties in mastering and overcoming technical problems • Difficulties letting go of the authority role as students became more autonomous • Workload • Inadequate financial resources • Lack of time to work on the project • Anxiety at the idea of using a technology • Technical problems • Challenges associated with international professional collaboration (eg, lack of time, scheduling conflicts, logistical challenges, lack of financial and technical resources, language barriers) • Lack of time to work on the project as part of the curriculum

Table 2 (*cont*)

Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
18	To assess which oral health-related web-based resources teachers consider most helpful and how attitudes, knowledge, and behavioral intentions concerning oral health-related teaching change between before and after having access to a resource website.	Oral health	• Material on the platform considered useful	• Questions about their role as educators in relation to dental care (brushing, flossing); putting more responsibility on parents to ensure their children's oral and dental health • Did not want dental health technicians to do this type of education with students
27	To assess student and teacher perception of sexuality education delivered online as a potential solution to address the gap in access.	Sexuality education	• Requires less planning of the material to be transmitted in the courses • Decrease in student assessment time • Acquisition of new content (eg, contraception) and way of transmitting the intervention	• Training needed on how to convey information or content • Sense of loss of control in terms of managing the class (difficulties in keeping students engaged in the task) and transmission of content • Need for more content to address students' needs (eg, influence of drugs, alcohol on decision-making)
28	To evaluate educators' views on the e-Bug teacher resources and gain insight into the current usage of e-Bug resources in schools.	Prevention of infections, appropriate use of antibiotics, vaccination	• Relevance of the resource (resource evaluated as excellent or good) • Comprehensive and interesting content • Appreciation of the interactive nature of the lesson plans • Attractive design and structure • Catchy and interactive resource for students	• Need for more in-depth content covering the usual lesson length • Need for additional content (eg, antibiotic resistance) • Need for different content/tools to provide different options for users (eg, resources for students with special needs) • Need for practical support tools (CD/DVD) or apps (9%) • Need for better promotion and dissemination of the resource
29	To pilot-test a "train-the-trainer" model to diffuse an interactive health education program into Alabama middle schools during a school year.	Nutrition	• Excellent pedagogical tool for teachers and students • A fun way for students to learn about the importance of making good choices about food and exercise • Platform increased students' interest in health education • Administrative support for delivery of good quality health education programs	• Only 21% had computers that were adequate for health education for students

Table 2 (*cont*)
Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
30	To pilot-test iCHAMPSS for usability and short-term psychosocial impact.	Sexual health	• Platform that is easy to use, credible, useful and sufficiently stimulating • More useful than other district resources for adopting, implementing, and sustaining the use of content related to pregnancy prevention • Enjoyable and user-friendly features and decision support tools • Accurate and trustworthy information	• Only 20% of respondents liked the liaison system (discussion forum); the vast majority found it difficult to use
31	To explore the role of innovation characteristics, individual attitudes and skills, and organizational factors in school providers' decisions to continue use of *Centervention*, a technology-based tool that supports implementation of evidence-based mental health interventions (EBIs).	Mental health	• Useful and relevant tool • Easy to use • Supported the implementation of mental health content • Intention to use the technology was significantly and positively associated with positive experience with the tool and successes experienced (ease of use, utility, satisfaction) • Intention to use the tool was associated with level of preparedness and available resources	• Ambivalent assessment of task effectiveness during use
32	To explore provider use of an online system, *Centervention*, to support the delivery of empirically supported school-based mental health interventions, and association between components of this system, implementation indicators, and student outcomes.	Mental health	• Relevant resource • Curiosity, desire to go deeper • Ease of access and navigation • Useful platform (eg, for printing additional materials, downloading videos, accessing more resources: reading lists) • Reasons for using the training tab: desire to learn, curiosity, convenience, obtaining training credits, increased confidence level, deepening of content, transmission of content in the recommended manner • Frequency of use of the training tab (to get more information, to complete the training in several sessions) • Use of the Progress Reports tab (eg, to help prioritize activities, monitor students' progress, and report to parents)	• Preference for using printed material that was already available • No need to use the training tab: looking at other tabs to answer questions • Lack of time, good familiarity with mental health education, uncertainty about the added value of using the program

Table 2 (*cont*)
Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
33	To assess the efficacy and acceptability of a web-based tutorial (Child Health Matters, CHM) designed to improve school nurses' communications with families about pediatric weight-related health issues.	Obesity prevention and treatment	• Response to needs (91.5%) • Development of skills to address the issue of obesity • Adequate duration and amount of training • Provided immediate access to a resource to support the intervention	
34	To perform a process evaluation among teachers and students to measure the levels of completeness and fidelity, identify factors influencing teachers' implementation, and to evaluate the students' response.	Sexuality and relationships	• Curiosity about new teaching materials • Linking content with new curricular requirements that emphasized interactivity • Diversity and interactivity of the exercises appreciated • Exercises motivated students to find their own information and answers • Usefulness of the accompanying manual • Appeal of content that received little attention in the teaching material • Useful, clear, and sufficiently supportive manual • Interactive nature of the exercises appreciated • Attractive, fun, and easy-to-navigate platform • Materials available free of charge • Teachers' positive attitudes towards LLL+ program • Implementation favoured by students' positive responses	• Need for more attention to other sexuality content; lack of depth in content provided by the platform. • Habit of discussing sexuality with their students using traditional methods • Time constraints (limited teaching hours) • Not seeing the added value of certain topics • Limited availability of computers • Problems reserving computer rooms • Computer rooms that did not facilitate group discussions • Dissatisfaction with the fact that the teachers' section was accessible to students • Problems accessing the site (eg, blocking of websites related to sexuality) • Inability to access online exercises • Negative class atmosphere • Cancellation of classes, changes in group composition, schedule changes • Other curriculum priorities

Table 2 (*cont*)
Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
36	To evaluate the reach, adoption, and implementation of HEALTH[e]TEEN, a school-based Internet obesity prevention program, and examine differences in student participation and satisfaction by school, sex, age, and race/ethnicity.	Obesity	• Positive assessment of content and functionality • Students demonstrated the ability to complete the online program at their own pace; able to interact among themselves • Very instructive program, constructed in such a way that children could identify with it • Attractive website	• Password requirements and technical challenges (eg, firewalls, need for assistance to obtain the program URL) • Lessons too long, extensive reading (difficult for students to maintain attention) • More instruction needed for teachers and students
37	To describe the process of developing a medicine education program for elementary and middle schools in Finland and the lessons learned during the process. Further described is how teachers evaluated the usefulness of the medicine education materials created during the process.	Medicine education program for students	• Material more useful to secondary school teachers, who recognized that the resource enabled them to be well informed and to teach on this unfamiliar subject • Turnkey materials available for primary school teachers (who have to teach many more subjects than secondary school teachers) to facilitate transmission of the content • Simple platform structure	• Need for additional content (eg, contraception) for teaching at the secondary school level • Content too dense and complicated for the primary school level • Content that appeared to overly encourage drug use (importance of promoting alternative ways of treating illnesses; new section created on different types of childhood illnesses) • Questioning how relevant the content on drugs would be to different age groups, for example, younger children (this content would be better directed to parents) • Need for lesson plans or programs specific to age groups (eg, instructions given that would be ready for immediate use) • Having readily available turnkey content (not just suggested activities) • Negative attitudes among some teachers towards drugs

cont on next page

Dagenais et al

Table 2 (*cont*)

Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
38	To describe the formative research and process of planning that formed the development of a program and the evidence base underpinning the approach.	Alcohol and cannabis use	• Positive attitude towards the proposed approach – harm reduction • Program suitably responsive (eg, in terms of educational content, student learning, lesson length) • Appropriate program for stage 4 of the syllabus • Lessons long enough to cover the concepts taught • Language used was adapted and understandable to Grade 8 students • Interactive and new features appreciated (eg, stimulating for the student) • Allowed access to the most recent versions • Basic content held students' interest • Required very little training to be used, while maintaining students' interest	• Some felt the program would be more appropriate for Stage 5 of the syllabus • Some lessons needed to be longer to allow students to better assimilate the content • Certain images presented to young children (eg, cannabis use) were considered unacceptable • Some terminology and factual information were deemed difficult for students to understand • Too much information, taught in too much depth • Insufficient availability of computers • Lack of focus on negative aspects of consumption (eg, long-term effects) • Easier for students to watch the animated cartoons using a projector or DVD
39	To describe the development of new interactive, bi-lingual Sex and Relationships Education (SRE) resources called Tyfu i Fyny/Growing Up, suitable for students aged between 5 and 12 years. It also discusses the evidence used to support the development of the resources, the support provided for teachers and parents and an initial evaluation following their use.	Sexuality and relationships	• Confidence in the content of the resource • Utility and improved teaching • Easy to use, colourful, attractive • Good quality ready-to-use resource • Suitable and interesting for children; children loved using it • Excellent animations • Comprehensive, new, and exciting resource • Easy to follow • Interactive nature appreciated	• Need to offer training and additional information to parents

Table 2 *(cont)*

Summary of Studies on Favorable and Unfavorable Conditions for Use by Teachers and Other Professionals in School Settings

References	Objectives	Themes	Favorable conditions	Unfavorable conditions
40	To provide insight into the process of systematic development of a Web-based coaching intervention to support teachers in their implementation of a school-based sexual health program.	Sexuality education	• Importance of having good quality materials and information for classroom use • Help provided by colleagues in the use of the system	• Not perceiving the importance of transmitting the content of the platform in its entirety and with fidelity • Feelings of shame or closed attitudes about sexuality; difficulty dealing with questions posed by students or problems encountered by students with respect to sexuality • Usual teaching method preferred over online teaching • E-coaching was desirable as long as the intervention was easy to use and accessible and did not require too much time or effort • Lack of time for use • Adequately supported by the accompanying hard-copy manual or by colleagues • Preference for communicating with colleagues from different schools to share ideas and methods

Teachers were positive about the website describing it as attractive, cheerful, and mostly easy to navigate.[33]

In general, the studies we reviewed made positive assessments of the user-friendliness of the various platforms positively. Only a few issues were raised, concerning technical problems, eg, problematic downloads, or access. For example, some complained about third-party access to conversations between users in discussion forums, and others, eg, students' ease of access to sections reserved for teachers. Additionally, teachers expressed a sense of loss of control, anxiety, or a lack of interest in the tool – teachers preferring to call upon a dedicated staff member rather than performing online research themselves, thereby hindering use.

A few teachers disliked that the teacher environment was accessible for students, or had difficulties shifting between students versus teacher environment or online versus offline implementation of program elements. [33]

Suggestions were made that could support or facilitate use, such as offering features that would be of practical use, such as an introductory video to present the platform. For example, in one study, 27 turnkey PHP program tools, ie, ready-to-print teaching materials, were developed at the users' request. The idea of providing information on the new pedagogical approach resulting from the use of a digital platform was also raised. For example, respondents noted that their role was being transformed with this use, taking the form of assistance to students. Interviewees also appreciated having access to a user manual, in hard copy or downloadable format, offering clear guidelines and providing sufficient support for use. Others would have liked to have a CD, DVD, or mobile application to support use.

All teachers indicated that the manual was helpful, clear, sufficient and supportive, particularly for certain modules.[33]

That a PHP program's online platform engages all stakeholders. This condition was underscored in 4 studies. These studies showed the extent to which collaboration among professionals, both within and outside the institutions, was a favorable or unfavorable condition for implementing a PHP digital platform. The greater this collaboration, the more positive impacts it appeared to have in

terms of use. In particular, it helped avoid overlaps in content transmission and introduced new ideas through feedback from all sides. In these studies, collaboration or cooperation among colleagues was considered crucial, as was the number of colleagues involved in collaboration. Diversity also appeared essential, eg, the involvement of different professionals in the same school and for different subjects in different schools. However, challenges related to collaboration were sometimes noted, including lack of time, scheduling conflicts, logistical challenges, and lack of financial and technical resources. Practical commitment to using ICT-Based learning environment required the school staff members to have more time for planning and cooperation between colleagues.

The teacher in "School B" who worked alone and only with a class of students initiated less interaction between students and with adults than other schools.[34] The involvement of several teachers from the same school in the project and from different subjects in "Schools A and F" appeared to be a facilitating factor.[34]

That a PHP program's digital platform is linked to existing programs in the school. This condition was raised in 4 studies. They highlighted the importance of including the technology project in the school's pedagogical activities. This involves ensuring that the project is integrated into course syllabi and academic course requirements, including activities in PHP integrated into the school's annual course planning, or the teacher's core curriculum or even requesting administrative support for these types of activities.

Two main reasons for incomplete implementation were limited time, such as limited teaching hours per week, and competing curriculum priorities, eg, students needing to work towards the national biology exams.[33] Only about one-half of participants reported that their principal supported quality health education.[28]

DISCUSSION

Two main observations can be drawn from the data in this review. First, the studies showed a preponderant participation of teachers, sometimes exclusively, sometimes with students and/or other school professionals. As such, they raise several issues of concern to teachers, many of which are reported

in the scientific literature in the field of education. Second, only a limited number of empirical studies could be identified for this review, indicating that this is an emergent field of study. The use of PHP digital platforms by teachers and other professionals appears recent, or at least, the scientific community's study of such use appears recent, as evidenced by the selected studies' dates of production.

Even though the studies are diverse in terms of methods, particularly with respect to design and rigor, they nevertheless reveal a set of conditions that appear favorable to the use of PHP digital platforms in school settings. These conditions highlight the importance of ensuring: (1) that the digital platform becomes a reference for PHP program activity in the school; (2) that the resources needed for its uptake are mobilized; and (3) that it is user-friendly. More marginally, but still significantly, 2 other conditions concerned the importance of ensuring: (4) that the digital platform engages the participation of everyone involved; and (5) that it is linked to existing programs in the school.

Repeatedly, the studies in this review underscored the importance of ensuring that school settings have adequate resources in terms of facilities such as Internet access, enough computers, and work organization, eg, time freed up, to support the use of PHP digital platforms. Although not specific to the implementation of programs in schools, this aspect, eg, ensuring the availability of sufficient human, material, and temporal resources in schools, is well documented in the education literature.[40-43] The user-friendliness of online platforms is also reported as a key requirement.[43]

Although most of our selected studies assessing the user-friendliness of the platforms were favorable, some issues were raised, having to do with technical problems including problematic downloads, access, certain apprehensions such as anxiety related to use, and some professionals' lack of interest in the idea of using a digital platform – all this illustrating a need for support and guidance in uptake and use. On these last points, the data showed that teachers appreciated when a digital platform provided turnkey teaching materials, a known facilitator for implementing PHP programs in schools or for using technology in educational activities.[44]

The review adds 3 other conditions that appear more specific to the school setting and more spe-

cifically concerns teachers' reality. The first has to do with the value and credibility that teachers attribute to content hosted on a digital platform based on that content's relevance and quality – a condition that, again, is echoed in the education literature.[40] That literature shows that teachers tend to use ICT when the content is of high quality and up-to-date, offers benefits, and is aligned with their values, pedagogical needs, and previous experiences.[40,43,45] On the other hand, it shows the potential for resistance to use when these conditions are not met.[40,43] Teachers must be convinced of the benefits and added value of use, either for themselves or for students,[45,46] as was highlighted in this review.

The second has to do with the diversity of professionals involved in the same school, as well as the online interactions, and intra- and inter-institutional collaboration; these aspects appear to drive the use of PHP digital platforms in the school setting. The education literature points to the same observation, eg, that teachers are more likely to use technology when they have the support of colleagues as some studies confirm.[40,43,45] However, we found mixed results on this point – the data showing that the school-based professional collaboration was a factor that could be both favorable and unfavorable to the use of PHP digital platforms in schools. Indeed, this review highlighted several challenges related to collaboration among colleagues, including lack of time, scheduling conflicts, logistical challenges, and lack of financial and technical resources.[16]

The third has do with the level of integration of PHP digital platforms into lesson plans or academic curricula. Although mentioned in isolation, this condition warrants attention, because curricular constraints can present obstacles to the use of PHP digital platforms, despite the best intentions of teachers and other school professionals.[35,47] The studies in this review provide a wealth of examples of integration efforts that could guide proponents of PHP program technology projects. For example, one platform documented by the review, *e-Bug*, which is widely distributed in several European countries, is integrated into the core curriculum of teachers and supported by both schools and authorities. It aims to promote appropriate behaviors among students in the areas of hygiene, infection prevention, and prudent use of antibiotics and vac-

cines. This platform has been implemented in 26 countries and translated into 23 languages.[27] However, the integration strategy for the platform has not been evaluated.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

In a guide produced by the World Health Organization (WHO) and the United Nations Educational Scientific and Cultural Organization (UNESCO),[48] the authors highlight evidence-based areas of implementation that should be prioritized to make every school a *Healthy School*. This requires that schools implement much more than specific health programs, and instead, take a holistic approach to promoting health and well-being, in which the culture, conditions, and programming of a school all contribute to a *Healthy School* system. To achieve this goal, they recommend that investments be made in school infrastructure – for example, facilities and spaces, as well as the development, revision, and implementation of curricula and their associated resources promoting health and well-being in school subjects. The training of professionals and the involvement of students in PHP activities or programs are also recommended.

Lack of time and workload are, however, recurring issues in schools. The context of austerity in education, including staff shortages and the lack of financial resources,[40-43] undoubtedly has an impact on the implementation of PHP programs. Among other aspects, the implementation of innovative educational PHP activities into the school environment appears essential.

The emerging use of digital platforms in education[14-16] represent a promising avenue in this regard. The review shows the value that the tool represents for professionals, including teachers, when it facilitates the circulation, transmission and use of relevant content or when it is eye-catching for professionals and interactive. In fact, schools can derive many benefits from the use of these platforms, and easily and inexpensively[15,17,18] facilitate the transmission and application of PHP content by professionals. In line with the recommendations formulated by the WHO and UNESCO, these platforms should, however, be based on a comprehensive approach to health by hosting, for example, not one, but several topics of interest to schools. Their integration into

the school environment also must be maximized by mobilizing policymakers, school administrators and professionals. More specifically, special interest should be paid in:

- establishing national objectives that put forward educational systems which, through planned actions, have the effect of institutionalizing the prevention and promotion of health in schools,[48] and
- financially supporting schools so that they can free up working time and offer the necessary resources to carry out PHP activities eg, enough computers in classrooms, online access, training, assignment of resource persons to support the use, knowing that PHP projects often take place alongside teaching activities and that it takes time to appropriate a PHP content.[8,12]

Researchers also should be involved, as the results of the review show the importance of:

- conducting research to improve understanding of the success factors in the use of PHP digital platforms by teachers and other school professionals, as the current knowledge pool is still sparse. Future studies should research collaboration between colleagues as a facilitator and constraint to use, as well as the facilitators to integration of digital PHP platforms in school curricula. This last aspect appears fundamental to support use although mentioned marginally in the review.
- conducting systematic reviews, including ScR, to offer useful lessons about the use of PHP digital platforms by students, as we identified many studies in this area. To our knowledge, there are no systematic reviews shedding light on the perceptions and uses of these types of platforms.

Human Subjects Approval Statement

Production of this paper did not involve collection of original data from human subjects.

Conflict of Interest Disclosure Statement

All authors of this article declare they have no conflicts of interest.

References

1. Basch CE. Healthier students are better learners: a missing link in school reforms to close the achievement gap. *J Sch Health*. 2011;81(10):593-598. doi: 10.1111/j.1746-1561.2011.00632.x

2. Banerjee R, Weare K, Farr W. Working with 'Social and Emotional Aspects of Learning' (SEAL): associations with school ethos, pupil social experiences, attendance, and attainment. *Br Educ Res J*. 2014;40(4):718-742. doi: 10.1002/berj.3114

3. Sklad M, Diekstra R, de Ritter M, Ben J, Gravesteijn C. Effectiveness of school-based universal social, emotional, and behavioral programs: do they enhance students' development in the area of skill, behavior, and adjustment? *Psychol Sch*. 2012;49(9):892-909. doi: 10.1002/pits.21641

4. Vanhelst J, Béguin L, Duhamel A, Amnios Y, Molnar D, De Henauw S et al. Physical activity is associated with attention capacity in adolescents. *J Pediatr*. 2016;168:126-131.e2. doi: 10.1016/j.jpeds.2015.09.029

5. Beshai S, McAlpine L, Weare K, Kuyken W. A non-randomised feasibility trial assessing the efficacy of a mindfulness-based intervention for teachers to reduce stress and improve well-being. *Mindfulness*. 2015;7(1). doi: 10.1007/s12671-015-0436-1

6. Martin C, Arcand L. *Guide à L'intention du Milieu Scolaire et de ses Partenaires pour la Réussite Éducative, la Santé et le Bien-être des Jeunes*. Québec: Ministère de l'Éducation, du Loisir et du Sport; 2005. www.santecom.qc.ca/Bibliothequevirtuelle/santecom/35567000066719.pdf. Published 2005. Accessed October 13, 2021.

7. Poulin R, Beaumont C, Blaya C, Frenette E. Le climat scolaire: un point central pour expliquer la victimisation et la réussite scolaire. *Can J Educ*. 2015;38(1):1-23.

8. Institut national de santé publique du Québec (INSPQ). *Pour des Interventions Intégrées et Efficaces de Promotion et Prévention en Contexte Scolaire : Assises Théoriques, Modèle et Savoirs Incontournables*. Québec: Gouvernement du Québec; 2013. www.inspq.qc.ca/pdf/publications/1789_Interventions_Integrees_Contexte_Scolaire.pdf. Published in September 2013. Accessed October 13, 2021.

9. Fenwick-Smith A, Dahlberg EE, Thompson, SC. Systematic review of resilience-enhancing, universal, primary school-based mental health promotion programs. *BMC Psychol*. 2018;6:30. doi: 10.1186/s40359-018-0242-3

10. Ickes MJ, Erwin H, Beighle A. Systematic review of recess interventions to increase physical activity. *J Phys Act Health*. 2013; 10(6):910-926. doi: 10.1123/jpah.10.6.910

11. Institut national de santé publique du Québec (INSPQ). *Les Facteurs Influençant la Dissémination et l'Adoption de l'Approche École en Santé*. Rapport de recherche. Québec: Gouvernement du Québec; 2008. www.inspq.qc.ca/pdf/publications/872_Rapport_EcoleSante.pdf. Published 2008. Accessed October 13, 2021.

12. Institut national de santé publique du Québec (INSPQ). *Le Développement des Enfants et des Adolescents dans une Perspective de Promotion de la Santé et de Prévention en Contexte Scolaire*. Québec: Gouvernement du Québec; 2017. www.inspq.qc.ca/sites/default/files/publications/2243_developpement_promotion_prevention_contexte_scolaire.pdf. Published 2017. Accessed October 13, 2021.

13. Stewart-Brown S. *What is the Evidence on School Health Promotion in Improving Health or Preventing Disease and, Specifically, What is the Effectiveness of the Health Promoting Schools Approach?* Copenhagen, Denmark: WHO Regional Office for Europe, Health Evidence Network. 2006. www.euro.who.int/document/e88185.pdf. Published 2006. Accessed October 13, 2021.

14. Orlando J. Teachers' changing practices with information and communication technologies: an up-close, longitudinal analysis. *Research in Learning Technology*. 2014;22. doi: 10.3402/rlt.v22.21354

15. Raiha T, Tossavainen K, Enkenberg J, Turunen H. Implementation of an ICT-based learning environment in a nutrition health project. *Health Educ*. 2012; 112(3):217-235. doi: 10.1108/09654281211217768

16. Simovska V, Jensen BB. On-line learning environments and participatory health education: teachers' reflections. *J Curric Stud*. 2008;40(5):651-669. doi: 10.1080/00220270701648092

17. Cobcroft RS, Towers S, Smith J, Bruns A. *Mobile Learning in Review: Opportunities and Challenges for Learners, Teachers, and Institutions*. Proceedings Online Learning and Teaching (OLT) Conference 2006. Brisbane, QLD, Australia: Queensland University of Technology; 2006:21-30. https://eprints.qut.edu.au/5399/. Published 2006. Accessed October 13, 2021.

18. Inglehart MR, Zuzo GA, Wilson JJ. Kindergarten/elementary school teachers and web-based oral health-related resources: an exploration. *Oral Health Prev Dent*. 2017;15(3):229-236. doi: 10.3290/j.ohpd.a38159

19. Bauer MS, Damschroder L, Hagedorn H, Smith J, Kilbourne AM. An introduction to implementation science for the non-specialist. *BMC Psychol*. 2015;3(1):32. doi: 10.1186/s40359-015-0089-9

20. Fixsen DL, Naoom SF, Blase KA, Friedman, RM, Wallace F. *Implementation Research: A Synthesis of the Literature*. Tampa, FL: University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network; 2005. https://nirn.fpg.unc.edu/resources/implementation-research-synthesis-literature. Published 2005. Accessed October 13, 2021.

21. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19-32. doi: 10.1080/1364557032000119616

22. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci*. 2010;5(69):69. doi: 10.1186/1748-5908-5-69

23. Davis K, Drey N, Gould D. What are scoping studies? A review of the nursing literature. *Int J Nurs Stud*. 2009;46:1386-1400. doi: 10.1016/j.ijnurstu.2009.02.010

24. Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB. Guidance for conducting systematic scoping reviews. *Int J Evid Based Health*. 2015;13(3):14-16. doi: 10.1097/XEB.0000000000000050

25. Paillé P, Mucchielli A. *L'analyse Qualitative en Sciences Humaines et Sociales.* 3rd ed. Paris, France: Armand Colin; 2012.

26. Chen E, Barrington C. "You can do it anywhere": student and teacher perceptions of an online sexuality education intervention. *Am J Sex Educ.* 2017;12(5):1-15. doi: 10.1080/15546128.2017.1298066

27. Eley CV, Young VL, Hoekstra BA, McNulty CAM. An evaluation of educators' views on the e-Bug resources in England. *J Biol Educ.* 2018;52(2):1-8. doi: 10.1080/00219266.2017.1285808

28. Geiger BF, Petri CJ, Myers O, Lan J, Binkley D, Aldige CR, Berdebes J. Using technology to teach health: a collaborative pilot project in Alabama. *J Sch Health.* 2002;72(10):401-407. doi: 10.1111/j.1746-1561.2002.tb03548.x

29. Hernandez BF, Peskin MF, Shegog R, Gabay E, Cuccaro PM, Addy RC et al. iCHAMPSS: usability and psychosocial impact for increasing implementation of sexual health education. *Health Promot. Pract.* 2017;18(3):366-380. doi: 10.1177/1524839916682004

30. Livet M, Yannayon M, Kocher K, McMillen J. Intent to sustain use of a mental health innovation by school providers: what matters most? *Adv Sch Ment Health Promot.* 2017;10(2):127-146. doi: 10.1080/1754730x.2017.1295814

31. Livet M, Yannayon M, Sheppard K, Kocher K, Upright J, McMillen, J. Exploring provider use of a digital implementation support system for school mental health: a pilot study. *Admin Policy Ment Health Serv Res.* 2018;45:362-380. doi: 10.1007/s10488-017-0829-7

32. Steele RG, Wu YP, Cushing CC, Jensen CD. Evaluation of child health matters: a web-based tutorial to enhance school nurses' communications with families about weight-related health. *J Sch Nurs.* 2013;29(2):151-160. doi: 10.1177/1059840512446070

33. van Lieshout S, Mevissen F, de Waal E, Kok G. Long Live Love+: evaluation of the implementation of an online school-based sexuality education program in the Netherlands. *Health Educ Res.* 2017;32(3):244-257. doi: 10.1093/her/cyx041

34. Vilaça T. A multiple case study based on action-oriented sexuality education: perspectives of the Portuguese teachers. *Health Educ.* 2017;117(1):110-126. doi: 10.1108/HE-02-2016-0006

35. Whittemore R, Chao A, Jang M, Jeon S, Liptak T, Popick R et al. Implementation of a school-based Internet obesity prevention program for adolescents. *J Nutr Educ Behav.* 2013;45(6):586-594. doi: 10.1016/j.jneb.2013.03.012

36. Hämeen-Anttila K, Airaksinen M, Vainio K, Bush PJ, Ahonen R. Developing a medicine education program in Finland: lessons learned. *Health Policy.* 2006;78(2-3):272-283. doi: 10.1016/j.healthpol.2005.11.007

37. Newton NC, Vogl L, Teesson M, Andrews G. Developing the climate schools: alcohol and cannabis module: a harm-minimization, universal drug prevention program facilitated by the Internet. *Subst Use Misuse.* 2011;46(13):1651-1663. doi: 10.3109/10826084.2011.613441

38. Roberts J. Tyfu i Fyny/Growing Up interactive bi-lingual resources to support the delivery of sex and relationships education for students aged 5 to 12 years. *Health Educ.* 2015;115(1):38-55. doi: 10.1108/HE-12-2013-0065

39. Schutte L, van den Borne M, Kok G, Meijer S, Ef Mevissen F. Innovatively supporting teachers' implementation of school-based sex education: developing a web-based coaching intervention from problem to solution. *J Med Internet Res.* 2016;18(7):e136. doi: 10.2196/jmir.5058

40. Chen FH, Looi CK, Chen W. Integrating technology in the classroom: a visual conceptualization of teachers' knowledge, goals and beliefs. *J Comput Assist Learn.* 2009;25(5):470-488. doi: 10.1111/j.1365-2729.2009.00323.x

41. Ertmer PA. Addressing first- and second-order barriers to change: strategies for technology integration. *Educ Technol Res Dev.* 1999;47(4):47-61. doi: 10.1007/BF02299597

42. Giavrimis P, Giossi S, Papastamatis A. Teachers' attitudes towards training in ICT: a critical approach. *Qual Assur Educ.* 2011;19(3):283-296. doi: 10.1108/09684881111158072

43. Zhao Y, Frank KA. Factors affecting technology uses in schools: an ecological perspective. *Am Educ Res J.* 2003;40(4):807-840. doi: 10.3102/00028312040004807

44. Dusenbury L, Brannigan R, Falco M, Hansen WB. A review of research on fidelity of implementation: implications for drug abuse prevention in school settings. *Health Educ Res.* 2003;18(2):237-256. doi: 10.1093/her/18.2.237

45. Ertmer PA, Ottenbreit-Leftwich AT. Teacher technology change: how knowledge, confidence, beliefs, and culture intersect. *J Res Technol Educ.* 2010;42(3):255-284. doi: 10.1080/15391523.2010.10782551

46. Durlak JA, DuPre EP. Implementation matters: a review of research on the influence of implementation program outcomes and the factors affecting implementation. *Am J Community Psychol.* 2008;41(3-4):327-350. doi: 10.1007/s10464-008-9165-0

47. Penalvo JL, Santos-Beneit G, Sotos-Prieto M, Martinez, R, Rodriguez C, Franco M. A cluster randomized trial to evaluate the efficacy of a school-based behavioral intervention for health promotion among children aged 3 to 5. *BMC Public Health.* 2013;13(1):656.

48. World Health Organization (WHO) and United Nations Educational, Scientific and Cultural Organization (UNESCO). *Making Every School a Health-Promoting School. Implementation Guidance.* Geneva, Switzerland: WHO and UNESCO; 2021. www.who.int/publications/i/item/9789240025073. Published 2021. Accessed October 12, 2021.

Appendix 1
Search Strategy: List of Key Words

Field (education)	Field (health)	Aspect (online technology)
Educational activity	Adolescent health	eHealth
Educational program	Child health	E-health
Elementary school	Government program	Electronic health
High school	Government strategy	Information system
Preschool	Health activity	Information technology
Primary school	Health behavior	Internet
School	Health education	Internet-based
School practitioner	Health intervention	Internet platform
Secondary school	Health prevention	Online-based
Teacher	Health program	Online program
	Health promotion	Online resource
	Integrated services	Online system
	Intervention strategy	Technology integration
	Planned program	Web-based
	Planned activity	Web platform
	School health services	Website
		Web site