

Editor's key points

► SCHOOLFirst is a bilingual resource that was developed to address returning students to school after concussion. An integrated knowledge translation approach was used, engaging multiple stakeholders throughout the work to ensure that educators' needs were met.

► Participants reported that SCHOOLFirst was easy to use and not complex. Most participants said they would like to use SCHOOLFirst frequently and would feel comfortable doing so. Participants were satisfied with the resource and reported that they would recommend SCHOOLFirst to others and use it in the future.

► Participants said their knowledge of available concussion resources to support students' return to school had increased after an education and training workshop. Their overall concussion knowledge improved, as did their knowledge of how concussion affects the return-to-school process. Most participants felt confident in their ability to help students return to school after concussion.

Exploring the value of the SCHOOLFirst return-to-school resource

Evaluating usability and satisfaction

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Abstract

Objective To cocreate an evidence-based resource to enable educators to support students returning to school after concussion; evaluate the usability of and users' satisfaction with the resource; understand the role of the resource in supporting students' return to school; and describe changes in concussion knowledge following a concussion education and training workshop.

Design Survey during a concussion education and training workshop.

Setting Holland Bloorview Kids Rehabilitation Hospital in Toronto, Ont, and York Region District School Board in Richmond Hill, Ont.

Participants Fifty-six educators, of whom 64% were teachers, 11% were school administrators, 23% fulfilled other roles (eg, child and youth worker), and 2% fulfilled unspecified roles.

Main outcome measures The survey collected demographic information, usability data via the System Usability Scale, and satisfaction data. Thematic analysis was used for open-ended questions.

Results Participants reported the resource to be easy to use (69.6%), not complex (62.5%), and most felt confident using this resource (83.9%). Participants indicated they were satisfied with the resource (73.2%) and would use it in the future (87.5%). Some found the resource overwhelming and recommended it be summarized in a reference guide. Participants found the links, videos, and classroom accommodations or academic supports to be helpful.

Conclusion SCHOOLFirst is an evidence-based, user-driven resource that was created for educators to support students returning to school following concussion. Educators, health care providers, youth, and families collaborated on developing SCHOOLFirst to improve students' successful return to school following concussion. Educators were satisfied with the resource and saw opportunities to use it to support their students.

Explorer l'utilité de la ressource SCHOOLFirst sur le retour à l'école

Évaluer la facilité d'utilisation et la satisfaction

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Résumé

Objectif Produire conjointement une ressource fondée sur des données probantes permettant aux éducateurs de faciliter le retour des élèves à l'école après une commotion cérébrale; évaluer sa facilité d'utilisation et la satisfaction des utilisateurs à son égard; comprendre le rôle de la ressource dans l'appui aux élèves lors de leur retour à l'école; et décrire les changements dans les connaissances sur les commotions cérébrales à la suite d'un atelier d'éducation et de formation sur le sujet.

Type d'étude Un sondage durant un atelier d'éducation et de formation sur les commotions cérébrales.

Contexte Le Holland Bloorview Kids Rehabilitation Hospital à Toronto (Ontario) et le Conseil scolaire du district de la région de York à Richmond Hill (Ontario).

Participants Il s'agissait de 56 éducateurs, dont 64 % étaient des enseignants, 11 % étaient des administrateurs scolaires, 23 % exerçaient d'autres rôles (p. ex. travailleur auprès des enfants et des jeunes) et 2 % avaient des rôles non spécifiés.

Principaux paramètres à l'étude Le sondage a permis de recueillir des renseignements démographiques, des données sur la facilité d'utilisation à l'aide de l'Échelle d'utilisabilité du système et des données sur la satisfaction. Une analyse thématique a été utilisée pour les questions à réponses ouvertes.

Résultats Les participants ont signalé que la ressource était facile à utiliser (69,6 %) et non complexe (62,5 %), et la plupart se sentaient à l'aise d'utiliser cette ressource (83,9 %). Les participants ont indiqué qu'ils étaient satisfaits de la ressource (73,2 %) et qu'ils l'utiliseraient à l'avenir (87,5 %). Certains ont trouvé que la ressource était surchargée et recommandaient qu'elle soit résumée en un guide de référence. Les participants ont jugé que les hyperliens, les vidéos, les accommodements en salle de classe et les soutiens scolaires étaient utiles.

Conclusion SCHOOLFirst est une ressource fondée sur des données probantes, axée sur les utilisateurs, qui a été produite à l'intention des éducateurs pour faciliter le retour à l'école des élèves à la suite d'une commotion cérébrale. Des éducateurs, des professionnels des soins de santé, des jeunes et des familles ont collaboré à l'élaboration de SCHOOLFirst dans le but de faciliter un retour à l'école couronné de succès après une commotion cérébrale. Les éducateurs étaient satisfaits de la ressource et voyaient des possibilités de l'utiliser pour soutenir leurs élèves.

Points de repère du rédacteur

► SCHOOLFirst est une ressource bilingue qui a été élaborée pour faciliter le retour à l'école après une commotion cérébrale. L'élaboration reposait sur une approche intégrée de transposition des connaissances, faisant appel à de nombreux intervenants durant tout le processus pour veiller à répondre aux besoins des éducateurs.

► Les participants ont signalé que SCHOOLFirst était simple et facile à utiliser. La plupart des répondants ont dit qu'ils aimeraient utiliser SCHOOLFirst souvent et seraient à l'aise de le faire. Les participants étaient satisfaits de la ressource et ont indiqué qu'ils recommanderaient SCHOOLFirst à d'autres et qu'ils l'utiliseraient à l'avenir.

► Les participants ont dit que leur connaissance des ressources accessibles sur les commotions cérébrales pour faciliter le retour des élèves à l'école s'était accrue à la suite d'un atelier d'éducation et de formation. Leurs connaissances générales au sujet des commotions cérébrales s'étaient améliorées, de même que leur compréhension de la façon dont les commotions cérébrales ont des impacts sur le processus du retour à l'école. La plupart des participants ont dit estimer être capables d'aider les élèves à retourner à l'école après une commotion cérébrale.

Returning high school students and younger youth to daily activities after a concussion (eg, school, learning environment, sport) is an iterative and complex process. Concussion guidelines do not provide adequate information on the timing, duration, or type of physical or cognitive rest.¹ Evidence is emerging; a 2017 systematic review highlights the lack of research available to guide the return to school after sport-related concussion in children and adolescents.² While not all youth return to sport, all youth must return to school and the learning environment after concussion.³ Concussion symptoms can result in declines in academic performance^{4,5} and in school attendance.⁶ Symptoms (eg, difficulty concentrating, fatigue, headache)⁷ can reduce a youth's ability to learn, complete memory-related tasks, or focus in the classroom.^{8,9}

A collaborative approach involving multiple stakeholders, such as health care providers, educators, and family members, is important for managing students' return to school.¹⁰⁻¹⁴ Health care providers and educators can recognize concussion symptoms, note changes in behaviour and academic performance,⁷ and identify appropriate accommodations or academic supports^{8,9,15} when failure to do so can result in poor learning outcomes^{9,16} and inappropriate expectations and interventions.

Research has shown that teachers know of concussion symptoms and understand the need for academic support after concussion.^{7,17} However, they are unaware of best practices for assisting students¹⁷ and lack confidence in their ability to implement accommodations or academic supports without guidance from physicians.^{18,19} There is a need for physicians to keep returning students to school top of mind²⁰ and to work with educators and families to optimize returning to school for youth.

A formal procedure for reintegrating youth back to school is paramount following concussion. While there is no consensus on how to most effectively return a student to the classroom after concussion, adhering to appropriate recommendations could prevent short- and long-term health and academic problems.²¹ Health care providers have an important role in recommending adjustments and academic accommodations or academic supports in alignment with students' symptoms and can share this information with the school.¹⁵

When educators lack knowledge of return-to-school processes and physician recommendations, youth can encounter negative consequences. For example, returning to school too soon after concussion can result in greater symptom severity and duration,^{8,22} which in turn affect youths' social development and academic learning.^{9,23,24} Or students withheld from school unnecessarily can feel socially isolated, develop depression, or have their academic standing damaged.^{9,24}

Return-to-school protocols are often mandated in school settings to help youth transition back to school after concussion.²⁵ These protocols focus on *when* to begin the return-to-school process and *what* steps

to take along the way. The essential component that is often missing is providing support to foster *how* to return to school. We have an opportunity to ground the creation of return-to-school protocols and resources in knowledge translation (KT) approaches and frameworks, and to evaluate their impact. Doing so will help ensure that teachers, parents, youth, and health care providers have what they need to support successful return to school following concussion.

Study objectives were to cocreate an evidence-based resource to enable educators to support students returning to school after concussion; evaluate the usability of and satisfaction with the resource; understand the role of the resource in supporting the return-to-school process; and describe changes in concussion knowledge following a concussion education and training workshop.

— Methods —

This resource was developed by a children's rehabilitation hospital (Holland Bloorview Kids Rehabilitation Hospital in Toronto, Ont) and York Region District School Board in Richmond Hill, Ont. This article describes the resource development and evaluation phases. Ethics approval was received by the hospital and school board's research ethics boards for evaluation of the resource.

Resource development

Principles of the knowledge-to-action cycle informed product development and pilot testing.²⁶ This framework involves gathering and refining knowledge (knowledge creation) to create resources, which are then implemented (action cycle).²⁶ The resource development process was informed by a qualitative research study by Greenspoon et al.²⁷ Semistructured interviews were completed with key stakeholders (eg, educators, students, physicians) to gain insight into individual experiences with the return-to-school process.²⁷ Interview data were analyzed to generate themes that informed the content and design of the resource. We used consensus statements²¹ and clinical practice guidelines²⁸ to ensure that the resource aligned with current best evidence. Using an integrated KT approach,²⁹ we leveraged expert opinions and collective experiences of health care professionals, researchers, KT experts, and teachers with experience in concussion and the return-to-school process to create the resource.

The resource, SCHOOLFirst, was designed to support education staff (eg, principals, teachers, guidance counselors) to enable successful return to school for youth following concussion. SCHOOLFirst aims to help educators understand their role as "concussion champions" by providing ideas on how to support students with a concussion in the classroom, school, or education system; sharing links to websites, videos, and tools to help build

their concussion knowledge; and offering a planning tool to identify actions to support students. SCHOOLFirst is a bilingual resource (English and French) that can be downloaded for free at <https://schoolfirstconcussion.ca/>.

Pilot testing: usability, satisfaction, and initial impressions

SCHOOLFirst was pilot-tested during an education and training workshop for educators. Surveys were used to test the usability of and satisfaction with the resource. The survey was administered after the workshop and collected demographic, usability, and satisfaction data.

Demographic data. Eight questions gathered information about participants' professional roles, types of classes taught, number of years in education, and experience working with youth with concussion. Level of concussion knowledge before and after participating in the education session and confidence in helping students return to school after concussion were also assessed via a 5-point Likert scale.

Usability data. The System Usability Scale (SUS),³⁰ a validated client usability questionnaire, was incorporated into the survey. The SUS is a 10-item questionnaire that asks respondents to rate their level of agreement with each statement on a 5-point Likert scale (strongly agree to strongly disagree). The SUS was devised to evaluate the usability and learnability of Web-based applications and demonstrates strong reliability and validity.³¹⁻³³ We adapted the questionnaire for this study, changing the word *system* to *resource*.

Satisfaction data. The research team purposefully developed 13 nonstandardized questions (closed-ended and open-ended) to evaluate initial satisfaction with SCHOOLFirst. The survey was developed with input from the research and clinical teams at the children's rehabilitation hospital, and it was pilot-tested with clinicians, KT and evaluation experts, and researchers before being used for data collection. These questions were used to determine participants' impressions of the resource (eg, likes, dislikes), their satisfaction using and navigating the resource, and recommendations for modifications. Participants were also asked whether they could see themselves using the tool to support students' return to school and to recommend supports that would encourage its use.

Participants

Elementary and secondary school teachers, administrators, and other staff were recruited for this study. Participants attended a 2-hour concussion education and training workshop where they received concussion education and were introduced to the resource. Participants were given information about the evaluation and gave their informed consent before participation.

Data analysis

Descriptive statistics (ie, frequencies) were used to analyze closed-ended questions (eg, Likert scales) on the demographic, SUS, and satisfaction components of the survey. Data collected through open-ended questions (ie, written responses) were analyzed through thematic analysis, in which common patterns were identified. Changes in self-reported concussion knowledge following the education and training workshop were analyzed using a Wilcoxon signed-rank test to account for Likert (ordinal) data.

— Results —

Demographic characteristics

Among the 56 participants were 36 teachers (64%), 6 administrators (11%), 13 participants who fulfilled other roles (eg, child and youth worker) (23%), and 1 participant whose role was unreported (2%). Eighty-two percent reported 15 or more years of experience working in education. Of the 36 teachers, 18 (50%) reported teaching primary and intermediate students (grades 1 to 8), 12 (33%) reported teaching high school students (grades 9 to 12), and 6 (17%) did not specify a grade.

Concussion knowledge and confidence

Participants said their knowledge of available concussion resources to support students' return to school had increased after the workshop. Their overall concussion knowledge improved, as did their knowledge of how concussion affects the return-to-school process. **Table 1** describes the shift in participants' knowledge from before to after the workshop. Participants reported improvement in their concussion knowledge specific to "knowledge of tools and resources available to support students' return to school after concussion" ($Z=-6.258$, $P<.001$), "overall concussion knowledge" ($Z=-6.205$, $P<.001$), and "knowledge of the impact of concussion on return to school" ($Z=-6.204$, $P<.001$).

Most participants felt confident in their ability to help students return to school after concussion. **Table 2** provides details of participants' confidence about facilitating students' return to school.

Usability of SCHOOLFirst

Participants reported that SCHOOLFirst was easy to use, not complex, and would not require assistance to use. Most participants said they would like to use SCHOOLFirst frequently and would feel comfortable doing so. Details regarding participants' perceptions of the usability of SCHOOLFirst can be found in **Table 3**.

Satisfaction with SCHOOLFirst

Participants were satisfied with the resource and made comments such as "This is desperately needed" and "[I] learned a lot about a topic I knew nothing about [or] felt

Table 1. Concussion knowledge before and after education and training workshop: N=56.

CONCUSSION KNOWLEDGE	LEVEL OF KNOWLEDGE, n (%)					
	1: NO KNOWLEDGE	2: SLIGHTLY KNOWLEDGEABLE	3: SOMEWHAT KNOWLEDGEABLE	4: MODERATELY KNOWLEDGEABLE	5: COMPLETELY KNOWLEDGEABLE	MISSING DATA
Before workshop						
• Knowledge of tools and resources available to support students' return to school after concussion	15 (26.8)	16 (28.6)	15 (26.8)	8 (14.3)	1 (1.8)	1 (1.8)
• Overall concussion knowledge (eg, causes, symptoms)	1 (1.8)	5 (8.9)	18 (32.1)	20 (35.7)	10 (17.9)	2 (3.6)
• Overall knowledge of the impact of concussion on return to school	3 (5.4)	15 (26.8)	14 (25.0)	15 (26.8)	7 (12.5)	2 (3.6)
After workshop						
• Knowledge of tools and resources available to support students' return to school after concussion	0 (0.0)	0 (0.0)	2 (3.6)	31 (55.4)	19 (33.9)	4 (7.1)
• Overall concussion knowledge (eg, causes, symptoms)	0 (0.0)	0 (0.0)	4 (7.1)	24 (42.9)	25 (44.6)	3 (5.4)
• Overall knowledge of the impact of concussion on return to school	0 (0.0)	0 (0.0)	4 (7.1)	23 (41.1)	25 (44.6)	4 (7.1)

Table 2. Confidence returning students to school following concussion: N=56.

QUESTION	LEVEL OF CONFIDENCE, n (%)					MISSING DATA
	1: NOT CONFIDENT AT ALL	2: SLIGHTLY CONFIDENT	3: SOMEWHAT CONFIDENT	4: MODERATELY CONFIDENT	5: EXTREMELY CONFIDENT	
How would you rate your confidence in helping students return to school following concussion?	0 (0.0)	0 (0.0)	9 (16.1)	29 (51.8)	10 (17.9)	8 (14.3)

uncomfortable with.” Overall, participants reported that they would recommend SCHOOLFirst to others and use it in the future. **Table 4** provides details regarding participants' satisfaction with the resource.

Participants identified the most helpful elements of the resource as checklists, guides, charts, and tables; links and videos; lists of classroom accommodations or academic supports; and organization of the tool. One participant commented, “I like the intro page and having the option to jump around to what I need right away.”

Providing quick access to key information and making the document less content heavy were suggested elements to improve upon. These points were highlighted by a participant who stated “Simplify—make it shorter and easier to use, or [supply] sections and chapters so I can quickly find what I want without having to scroll through.” Improving technical aspects of the document, such as links opening up in new Web browser tabs and adapting the content to make it more suitable for younger children,

were also suggested. Participants recommended supports to help them use SCHOOLFirst, such as in-person and online training workshops and printed materials.

Overall, participants thought that many would benefit from using SCHOOLFirst. These stakeholders included students, parents, coaches and athletic organizations, day-care and before- or after-school program providers, health care providers, and anyone in the community working with children and students.

— Discussion —

SCHOOLFirst is a bilingual resource that was developed to address returning students to school after concussion. It has been available online and in paper format since April 2018 and has been disseminated via social media, educational outreach events, and conferences.

Use of the knowledge-to-action cycle²⁶ guided the steps taken to ensure the evidence was reviewed,

Table 3. Usability of the SCHOOLFirst resource: N=56.

QUESTIONNAIRE STATEMENT	LEVEL OF AGREEMENT, n (%)					MISSING DATA
	1: STRONGLY DISAGREE	2: DISAGREE	3: NEITHER AGREE NOR DISAGREE	4: AGREE	5: STRONGLY AGREE	
I think I would like to use this resource frequently	1 (1.8)	3 (5.4)	10 (17.9)	20 (35.7)	22 (39.3)	0 (0.0)
I found the resource unnecessarily complex	9 (16.1)	26 (46.4)	11 (19.6)	3 (5.4)	3 (5.4)	4 (7.1)
I think the resource was easy to use	1 (1.8)	2 (3.6)	12 (21.4)	26 (46.4)	13 (23.2)	2 (3.6)
I think I would need assistance to be able to use this resource	42 (75.0)	9 (16.1)	3 (5.4)	1 (1.8)	0 (0.0)	1 (1.8)
I think the various functions in this resource are well integrated	0 (0.0)	1 (1.8)	8 (14.3)	27 (48.2)	19 (33.9)	1 (1.8)
I think the resource is too inconsistent (ie, in design, content, flow)	31 (55.4)	18 (32.1)	3 (5.4)	1 (1.8)	0 (0.0)	3 (5.4)
I think most people would learn to use this resource very quickly	1 (1.8)	3 (5.4)	14 (25.0)	23 (41.1)	13 (23.2)	2 (3.6)
I found the resource cumbersome to use	17 (30.4)	19 (33.9)	8 (14.3)	9 (16.1)	1 (1.8)	2 (3.6)
I felt confident using the resource	0 (0.0)	1 (1.8)	5 (8.9)	29 (51.8)	18 (32.1)	3 (5.4)
I need to learn a lot of things before I could use this resource	31 (55.4)	20 (35.7)	2 (3.6)	1 (1.8)	0 (0.0)	2 (3.6)

Table 4. Satisfaction with the SCHOOLFirst resource: N=56.

QUESTIONNAIRE STATEMENT	LEVEL OF AGREEMENT, n (%)					MISSING DATA
	1: STRONGLY DISAGREE	2: DISAGREE	3: NEITHER AGREE NOR DISAGREE	4: AGREE	5: STRONGLY AGREE	
I am satisfied with the resource	0 (0.0)	1 (1.8)	10 (17.9)	22 (39.3)	19 (33.9)	4 (7.1)
Interface of the resource is visually appealing	0 (0.0)	3 (5.4)	8 (14.3)	28 (50.0)	17 (30.4)	0 (0.0)
I would recommend this resource to other teachers	0 (0.0)	1 (1.8)	4 (7.1)	16 (28.6)	34 (60.7)	1 (1.8)
This resource has information that will assist me in helping return my students to the classroom and engage in school-based activity following concussion	0 (0.0)	0 (0.0)	3 (5.4)	18 (32.1)	35 (62.5)	0 (0.0)
I will use this resource in the future when supporting a student with concussion	0 (0.0)	1 (1.8)	6 (10.7)	12 (21.4)	37 (66.1)	0 (0.0)

facilitators of and barriers to using return-to-school resources were identified, and stakeholder needs were addressed to create a user-driven resource. An integrated KT approach²⁹ was applied, engaging multiple stakeholders throughout the work to ensure that educators' needs were met. Stakeholders informed the resource's content, organization, and build, resulting in a multimodal product that is user driven and user focused.

Our findings integrate well into the existing body of literature. The US Centers for Disease Control and Prevention developed a concussion tool kit for high school coaches. An evaluation showed self-reported increases in knowledge, improved attitudes, and better

practices concerning prevention and management of concussions.^{34,35} Our findings with high school teachers and optimization of return to school after a concussion are similar.

Literature emphasizes that returning to school can be successful when we provide concussion education and training for school personnel^{14,36}; maintain ongoing communication^{18,36,37} and collaboration among health care providers, schools, students, and family members to support returning to school^{14,36}; create a concussion-friendly environment³⁶; and develop, use, and support (eg, with forms, symptom checklists)^{36,38} tailored return-to-school plans informed by health care providers.³⁶ SCHOOLFirst

addresses these recommendations by providing links to concussion education resources and discussing the collaborative nature of return-to-school processes and the roles of various stakeholders. This resource provides strategies to create a concussion-friendly culture and environment, and it includes resources to support students' return to school (eg, academic accommodations or academic supports, having effective conversations about return-to-school needs). Future directions could involve formal training on how to use SCHOOLFirst to ensure that educators feel confident that they can support successful return to school following concussion.

While SCHOOLFirst was created for educators, it can be used by various audiences. Medical professionals are key to detecting and assessing changes in concussion symptoms and their impact on youths' ability to engage in school. They work with youth, families, and schools to determine the necessary accommodations or academic supports that set students up for success in alignment with their signs and symptoms. Medical professionals across Canada can use SCHOOLFirst to ensure all Canadian youth with concussion and their families are properly supported for returning to school.

Limitations

This study aimed to provide the initial step toward evaluating the usability of and satisfaction with a postconcussion return-to-school resource for educators. Additional demographic data specific to age and sex should be gathered as part of future research. These data would allow age- and sex-based analysis with respect to stakeholders' perspectives, which could help make KT initiatives better targeted and more successful.

Although the self-developed survey used in this study underwent pilot testing with clinicians, KT and evaluation experts, and researchers before being used for data collection, we believe further validity and reliability testing of this survey would be beneficial.

Members of a single school board were engaged to develop and pilot-test SCHOOLFirst. Engaging multiple school boards at a provincial and national level would have allowed for the SCHOOLFirst resource to reflect various perspectives across school boards when returning students to school.

Immediate shifts in knowledge and confidence were measured in this study. Assessing knowledge maintenance over time after attending the education and training workshop would have been beneficial. Further, reassessing educators' confidence in using the SCHOOLFirst resource, as well as examining changes in their practices for supporting students returning to school after concussion, would have been valuable.

Conclusion

SCHOOLFirst is a resource designed to address how to return students to school following concussion. Educators

were satisfied overall with this user-informed resource and found it easy to use. The SCHOOLFirst initiative is ongoing. Next steps include developing companion resources and executing a pan-Canadian and international dissemination strategy to put this resource into the hands of all key stakeholders (eg, educators, medical professionals) to help ensure successful return to school after concussion for all Canadian youth. Further research on the impact and effectiveness of this resource is warranted.

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Contributors

All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

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