Is a "picture" worth a thousand words? Examining the impact and user-friendliness of infographics versus text-only material amongst teachers introduced to the Zones of Regulation program

Background and Introduction

Infographics & Knowledge Translation

According to The Canadian Institutes of Health Research, knowledge translation (KT) is "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system (Government of Canada, 2016). Dissemination involves both identifying a target audience to whom a message can be communicated and creating an effective method for the communication.

One way to disseminate information to relevant stakeholders is through information graphics (infographics; McCrorie, Donnelly, & McGlade, 2016). There are several types of infographics including but not limited to: informational, process, hierarchical, and list (The Easelly Blog, 2020). The choice of which infographic to use depends on the type of information the knowledge holder would like to present.

The history of communicating through graphics extends as far back as 37,000 BC if not earlier, though the birth of data-based social science was not until the 1830s (Murray et al., 2017; Nomade et al., 2016; Spiegelhalter et al., 2011). Still, using infographics for translating healthcare information and scientific research is a relatively new KT method (Murray et al., 2017). Infographics have the ability to promote health and well-being through a combination of pictures, text, and visuals (Crick & Hartling, 2015; Murray et al., 2017). Presenting information with graphics has been shown to enhance comprehension of data and information (Crick & Hartling, 2015). Further, infographics can effectively synthesize a great deal of information in an easy to digest format that may better engage the reader compared to text-only material.

More recently, studies that have compared visual instructions to text-only instructions for building furniture have shown that visuals were more effective (e.g., Antifakos et al., 2002). In addition to enhancing understanding, memory researchers have shown that retention and recall is superior for visual versus verbal information (Crick & Hartling, 2015; Murray et al., 2017; Scott et al., 2016). In fact, three days after learning new information, we can remember up to six and a half times more from an infographics than by reading text alone (Scott et al., 2016). Elements of a visualization thought to influence better memory include: pictograms, color, low data-to-ink ratios, and high visual densities (Crick & Hartling, 2015). As a result of these recent findings, researchers are being encouraged to use data visualizations such as infographics to disseminate their work.

Emotion Regulation

Emotion regulation is defined in various ways in the psychology field, but broadly, it encompasses the ability to monitor and manage one's emotions and behaviour (Child Mind Institute, 2021). Behaviourally, dysregulated children may appear overly angry or aggressive, or may present as extremely sad in response to real or perceived situations. Further, the magnitude of the emotional response typically does not fit the situation. In addition to externalizing behaviour, additional consequences of emotion regulation difficulties include internalizing symptoms such as depression and anxiety (Döpfner et al., 2019).

Emotion regulation difficulties are present in 3% to 20% of children and youth in the general population (Brotman et al., 2006), though it can vary with a prevalence of up to 80% depending on whether there are comorbidities such as attention deficit hyperactivity disorder and oppositional defiant disorder (Pylypow et al., 2020). Given the detrimental consequences of emotion regulation difficulties on children's academic and social-emotional development (Rawana et al., 2016), implementation of an evidence-based program that can be delivered in classrooms by teachers, such as Zones of Regulation, is crucial. Zones of Regulation is "a systematic, cognitive-behavioral approach used to teach us how to regulate our feelings, energy and sensory needs" (Zones of Regulation, 2021).

The emotion regulation literature is large and ever growing. Teachers are faced with the challenge of keeping up with the information as well as learning about different evidence-based practices suitable for classroom use. As a result, we see a role for infographics as a KT tool for teachers to learn about interventions, such as Zones of Regulation.

Study Aim

The broad aim of the proposed study is to compare the use of infographics relative to text-only educational material in promoting the Zones of Regulation program among Grades 1-6 teachers.

Specific aims include:

Aim 1a: Examining the impact of infographics (relative to text-only educational material) in promoting teachers' knowledge about and interest and confidence in delivering the Zones of Regulation program. This will be assessed using a survey.

Aim 1b: Examining whether there are differences within groups regarding teachers' pre and post knowledge, interest, and confidence scores.

Aim 2: Examining the user-friendliness of the infographics and text-only educational material through semi-structured interviews. We are interested in collecting qualitative feedback on the aspects (e.g., content, format, layout) of the infographics and text-only educational material that are helpful or deemed missing from the teachers perspective.

Method

Participants

Utilizing our existing relationship with the York Region District School Board, we will send an invitation letter to elementary school administrators (i.e., school principals and vice principals) to advise that we are recruiting classroom teachers (Grades 1-6), who are not currently familiar with and who have never used the Zones of Regulation program. We will follow-up with administrators by phone or email one week after sending the initial invitation letter to collect information on the number of teachers who are willing to participate in this research.

Study Sample. One hundred teachers will be recruited for the study. Participants will be randomized into two equal groups matched for participant age, years of teaching, and gender. One group will receive text-only education material and the other group will receive infographics. Both presentations contain the same information about emotion regulation difficulties and the Zones of Regulation program.

Materials

The infographics and text-only material will be created to share information about three learning objectives: 1) emotion regulation difficulties in school-aged children and the implications of these difficulties on educational and social-emotional outcomes, 2) an overview of the Zones of Regulation program, and 3) research findings regarding the effectiveness of the Zones of Regulation program delivered in the classroom setting.

The infographics and text-only material will be informed by a comprehensive literature review on children's emotion regulation difficulties and the Zones of Regulation program as well as consultation with educators who have experiences in teaching emotion regulation skills in a classroom setting. The infographics and text-only material will be piloted by a group of five teachers who do not have prior experience with the Zones of Regulation program to obtain feedback on the content and format (e.g., colour, layout) of the infographics and text-only educational material.

Infographics. Based on previous research, the effectiveness of infographics is influenced by a number of factors such as: aesthetic value, user-friendliness, ability to achieve predetermined goals, and the authority of the team who is presenting the infographics (Dunlap & Lowenthal, 2016). Therefore, these are the principles that will be used to guide the development of our infographics (Murray et al., 2017; Scott et al., 2017). The design of our infographics will also consider the aesthetic learning experience framework, which was used by Dunlap and Lowenthal (2016) to evaluate and highlight important qualities found in several most 'liked" infographics online. Our research team will also collaborate with two graphic design experts to make sure the infographics are effective in their ability to communicate information and are visually appealing.

In terms of the layout, we will create three different types of infographics (The Easelly Blog, 2020), one for each of the three learning objectives. The decision is guided by the types of information that we would like to visualize. First, we will use a statistical infographic to illustrate the prevalence of emotion regulation difficulties among children using charts and graphs. Second, we will use a process infographic to outline the steps of the Zones of Regulation program. Finally, we will use a list-based infographic to present research that supports the Zones of Regulation program. We will ensure our infographics work together to present a complete message that is structured logically. The use of different types of infographics will also help teachers organize their new knowledge and reduce the amount of time it takes to process the information.

Regarding content, we will ensure the infographics provide a coherent and clear narrative that emphasizes key messages (Dunlap & Lowenthal, 2016). Given that elementary teachers are our primary audience, we will highlight the high prevalence of emotion regulation difficulties among elementary school children and the impact of these difficulties on their social and educational development. The goal is to establish a sense of immediacy and to compel teachers to take prompt action by implementing the Zones of Regulation program in their classrooms. We will also include brief testimonials from teachers about the impact of emotion regulation difficulties on learning to enhance our sample of teachers' emotional connection to the program. Further, we will ensure our messages are credible and believable by citing sources of information and highlighting our team as experts in emotion regulation and child development.

In terms of visual design, we will maintain a balance between visualizations, images, and text (Scott et al., 2017). First, we will create a compelling title to attract readers (Scott et al., 2017). Second, we will use three to five complementary colours and two font types as recommended by Murray and colleagues (2017) to ensure consistent design elements throughout the infographics. We will also limit the number of images and text areas and increase the saturation and contrast between colours to ensure the infographics make a good first impression (Harrison et al., 2015). Third, we will employ simple and precise visuals to convey and focus the reader's attention on important aspects of the learning objectives. We will avoid using visual elements that are decorative in nature that detract from our key messages (Dunlap & Lowenthal, 2016). Fourth, we will use text sparingly in the infographics and ensure text is only used to supplement the visuals in an effort to enhance clarity and increase comprehension (Scott et al., 2017). Prior to creating the infographics, we will devise a list of important information related to the three learning objectives to plan the layout of the infographics and to ensure only synthesized research information is presented in the infographics.

Text-only. We will create a one-page, double-spaced, typed (Times New Roman size 12 font), text-only summary for each of the three learning objectives. This will include bolded relevant headers to organize the information.

Procedure

In September 2021, all participants will receive a pre-survey through Qualtrics consisting of 10 questions. This will allow us to collect demographic information including: age, gender, and number of years teaching. Questions will also assess teachers' baseline knowledge about and

interest in administering the Zones of Regulation program. Questions will also assess teachers' current level of confidence in delivering the Zones of Regulation program. Following completion of the pre-survey, teachers will be sent either the infographics or the text-only material. Both infographics and text-only material will be saved as a PDF and will be delivered electronically to teachers' emails. Two weeks later, we will send them a post-survey through Qualtrics to assess teachers' knowledge, interests, and confidence in the program.

In October and November 2021, we will conduct semi-structured focus groups to collect teachers' feedback regarding whether the infographics and text-only materials are user-friendly. Each focus group interview will include six to eight teachers and will last one hour and a half. Graduate level researchers will conduct the interviews. All interviews will be recorded and transcribed verbatim. Participants will have the opportunity to enter a draw to win a $100 coffee shop gift card.

Analysis & Expected Outcomes

Aim 1a: We will use ANOVA to compare the two groups of teachers' pre and post knowledge, interest, and confidence scores.

Expected outcome 1a: Although we anticipate that teachers in both groups will report similar levels of knowledge after reviewing either the infographics or text-only material, we expect that teachers in the infographic group will report greater interest and confidence in delivering the program relative to the teachers in the text-only group.

Aim 1b: We will use ANOVA to compare each group independently on their pre vs. post knowledge, interest, and confidence scores.

Expected outcome 1b: For both infographics and text-only groups, we hypothesize that teachers will report greater levels of knowledge, interest, and confidence in the Zones of Regulation program from pre to post delivery of the material.

Aim 2: We will use thematic analysis to code and analyze the focus group interviews to identify themes relevant to teachers' feedback on the format (e.g., design, layout, colour), and content (e.g., how easy it is to understand the information) of the infographics and text-only material.

Expected outcome 2: Qualitatively, we expect that teachers in the infographics group will find the infographics informative, coherent, easy to understand, and visually appealing. In terms of the specific aspects of the infographics, we expect teachers to remark on the benefit of using different types of infographics for communicating the key messages within each learning objective. We expect that teachers will appreciate the simplistic, yet comprehensive design of the infographics which involves a clear and compelling title, a balanced amount of text and visuals, and the use of consistent design elements (e.g., colours, font types). Further, we expect that teachers will find that the content of the infographics resonates with the emotion regulation difficulties they have observed first hand in the classroom.

With regards to the specific aspects of the text-only educational material, we expect that teachers in this group will find the material informative, detailed, and coherent. However, they will remark that it does not capture their attention, takes them a while to digest the information, and that it was not very engaging to read.

Impact/Implications

The impact of this research extends beyond academia. We will publish the results and the infographics (the latter pending permission from the creators of the Zones of Regulation program), in a high-impact journal and present at international psychological and educational conferences. We will also create lay summaries and graphical abstracts/infographics for stakeholders (e.g., school administrators, teachers) to share knowledge about the role of infographics in educating teachers about emotion regulation and the Zones of Regulation program.

We hope that our research will address a gap regarding the impact and user-friendliness of infographics as a KT tool in the area of emotion regulation and teacher-led intervention for emotion dysregulation. If we are able to demonstrate the impact and user-friendliness of infographics as a way to promote the Zones of Regulation program, we plan to circulate our infographics on social media (e.g., Twitter, Facebook; again pending permission from Zones of Regulation) and through the York Region District School Board administration listserv to extend the reach of this project. This will permit all school administrators within the board to utilize the infographics and promote the Zones of Regulation program and knowledge regarding emotion regulation at their respective schools. The infographics will also be shared across other school boards to increase students' access to teacher-led, evidence-based, emotion regulation intervention.

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