





A Co-creation Intervention to Support the Design of a Telehealth Service at School

Basma Jallad^(✉)  and Luciana Pereira 

Federal University of ABC, Santo Andre, Brazil
basma.jallad@ufabc.edu.br

Abstract. Telehealth refers to the provision of health-related services and information via electronic information and telecommunications technologies. Health promotion programs are essential to improve health outcomes for adolescents, including improvements in their quality of life, functionality, independence, and equity. A student's access to health care providers through school-based telehealth expands and improves, allowing them to stay or become healthy and focus on learning. To achieve these results is determinant to understanding how the social surroundings among adolescents affect their understanding of a healthy lifestyle and well-being. We co-created an innovative research protocol in need of understanding adolescents by employing a student-centered approach, dialogical communication method, and a student's narrative creation of digital storytelling to help decision-makers with building a telehealth network, developing its health information exchange, and supporting an ambitious rollout of health information technology to assist a large number of adolescents through the creation of school-based telehealth initiatives by comprehending how digital health innovative strategies can address student health needs and combat growing concerns about student well-being when considering the digitalization of the Brazilian Health School Program (Programa Saúde na Escola - PSE).

Keywords: Telehealth · School well-being · Dialogical Communication

1 Introduction

Telehealth is a growing model of delivering health care [1]. Implementation of school-based telehealth programs has been widespread in recent years; they have the potential to fill new gaps in health care [2] and are efficient and effective way to overcome barriers to care and improve health for children.

With its commitment to well-being, the Health in Schools Program aims to improve the well-being of adolescents, teachers, other staff, families, and emphasizes bringing mindfulness to the community [3]. The overarching objective is to benefit everyone involved in the education and well-being of the children.

To address the vulnerabilities that compromise the full development of children and young people from the public school system, the Brazilian government established the Health at School Program (PSE) in 2007. This intersectoral policy was developed by

the Ministry of Education and the Ministry of Health in conjunction with Municipalities to contribute to the comprehensive training of students and the school community with actions of promotion, prevention, and health care [4, 5].

We propose an innovative intervention protocol that uses a dialogical communication participatory design approach which is an important contribution to the formulation of a school-based telehealth service.

In this paper Sect. 2, discusses prior relevant. Section 3 describes the methods used. Section 4 evaluates the models and protocols that have been co-created during this research. And, Sect. 5, which presents the main research conclusions.

2 Theoretical Foundations

2.1 Health Communication with Adolescents

Concerning the crucial developmental process of preparing for and transitioning into adulthood, the significance of adolescence is highlighted. Becoming more independent and autonomous also occurs during this time [6]. The important developmental milestones are reached during this time, and the adolescent learns more about who they are and creates their self-identity.

Adolescence is characterized by increased likelihood of engaging in risky behaviors [7]. Therefore, health services need to be equipped with preventative measures, encouraging other healthy outlets for identity explorations [8].

Paulo Freire [9] takes communication as dialogue which essence refers to reciprocity. He proposed human communication as dialogue and the recognition of the other as a subject.

Communication barriers are especially problematic as many leading causes of mortality and morbidity in adolescents, such as smoking, drug use, and suicide attempts are preventable, and the damage they cause can extend well into adulthood [10].

The analysis of previous studies reported that communication barriers existed when revealing sensitive and personal aspects of adolescents' lives. These barriers were experienced by the young adolescents, their parents and healthcare providers [11]. Participants expressed feeling worried for being misunderstood or judged [12].

According to Binder [12], adolescents described that when they experienced an authentic intention for caring, they develop a sense of trust that their health care providers were working for their best interest with a non-judgmental attitude. This enabled them to more easily discuss health issues that can be often personal and sensitive. Health care provider's open-ended questions, while being sensitive to adolescent autonomy and personal choices in making healthy lifestyle changes, were strong predictors in motivating participants to make positive changes [13].

Adolescent participation in health communication often includes a personalized approach with correctly articulated, non-judgmental language. Thus they can identify their own health risks and be proactive about their health-related behaviors [14, 15].

Improvements in contact with adolescents can be anticipated when other factors such as time constraints, and staff burnouts are moderated as well [16]. It is for this purpose that health providers explain to adolescents why they are asking such questions, the

type of resources they are providing, the ethical and professional standards of healthcare providers and confidentiality policies [17, 18].

In a research from Dawkins-Moultin et al. [19], they propose that public health literacy interventions integrate the principles of “socioecology” which operates on the premise that health outcome is hinged on the interplay between individuals and their environment, and “critical pedagogy” that assumes education is inherently political, and the ultimate goal of education is social change to develop interventions empowering individuals and communities. Integrating these two approaches will provide a useful frame to develop interventions that move beyond the individual level.

Sykes et al. [20], argued for community development to embrace and advance the concept of critical health literacy in order that; its potential to address inequalities in health can be achieved and to create an opportunity to embed community development more fully within health policy and practice.

2.2 Fostering Adolescents’ Health Literacy with Innovative Media

Innovation is a key to confronting many issues facing humanity. It can be defined variously and tends to include problem-solving processes [21], executing novel ideas to create societal value [22] and applied creativity [23]. The capacity to refine existing ideas and challenge existing ideas is a very important and thankfully human process drawing intense interest from a range of disciplines [24, 25].

Over the past decade, new technology and media have changed the way we communicate, access information, and share content. The children of the current millennium are the first generation to own a Smartphone device during their middle childhood [26]. The American Academy of Pediatrics now encourages all pediatricians to increase their knowledge of new media and technology. Connectivity and social networking among adolescents allow potential innovative applications in health promotion. At the same time, practitioners move toward integrating new media into clinical and health education settings.

Adolescents use Smartphone to explore their identity and maintain constructive interpersonal relationships with family and friends [27]. Adolescents perceive online communication platforms as a comfortable setting for emotional self-disclosure [28]. Also, there are striking similarities between people’s behaviors in real life and virtual social interactions [29].

Educators and clinicians use Smartphone-based networking such as WhatsApp and Facebook to reach out to adolescents [30] which contributes to adolescents’ well-being, and most teens appreciate these efforts.

3 Research Design

In the current study, we are working in collaboration with the Municipality of Santo André concerning the schools participating in the Brazil’s Health School Program, the number of participating schools in the PSE between 2018 and 2020 were 29 schools with around 6000 students divided on 7 territories connected by Basic Health Units.

3.1 Identifying Students at Risk of Psychosocial Problems

This protocol takes a rigorous analog of gathering disease-specific information in a medical evaluation. The “Anamnesis School Script” focuses on assessing the student’s condition and is standardized within each study. It is designed to elicit information on the participant’s general and condition-specific medical status, management issues, and health care needs. To carry out a good anamnesis, it is necessary to know how to listen. We give the chance for the parents/guardians to fill this questionnaire. We adapted the traditional Anamnesis as per our study needs. It consists of the following items: Personal Data, Family, Health, Style of Life, School Records, and Communication. Our ready to validate adapted “Anamnesis School Script” digital protocol is available at <https://freeonlineveys.com/s/NCjBIATc>

3.2 Assessing Students’ Quality of Life from Their Perspective

Health-related quality of life (HRQL) is a multidimensional concept that features domains associated with physical, mental, emotional, and social functioning. It focuses on the impact health status has on quality of life. A related concept of HRQL is well-being; it evaluates the positive aspects of a person’s life, such as positive emotions and life satisfaction.

HRQL is measured with a standardized, previously validated instrument appropriate to the age of study participants and the medical condition studied [31]. It implements an instrument appropriate to the condition being investigated and standardized within each study. The current study uses a general health status instrument, the HEEADSSS, which is an inclusive psychosocial assessment tool distinguishing risk and protective factors and assists health professionals create a plan in partnership with adolescents. Our ready to validate adapted “HEEADSSS” digital protocol is available at <https://freeonlineveys.com/s/4K41zzph>.

3.3 Listening to Students Through Digital Storytelling

Community-based participatory research (CBPR) was established in the past 25 years as valued research approaches within health education, public health, and other health and social sciences for their efficacy in reducing inequities [32]. In the process of cocreation, we worked with the school staff, students, and UBS to understand the student’s contexts so that our intervention becomes an evidence-based tool.

Digital stories are potent forces within the lives of adolescents as they shape opinions, assumptions, and alignments with the knowledge of everyday lives. Youngsters get much enjoyment and feel intelligent and knowledgeable as they scroll quickly through a web search on information, images, news, and stories. They are content consumers and content creators who enjoy dramatic engagements and can produce stories as communication texts [33].

We based this step of the study on an American drama comedy television series called “Everybody Hates Chris”. We proposed to watch selected episodes of the series that address different topics such as bullying, health, friendship, and education, and then start open-ended questions and discussions. Everyone is expected to have their own

opinion about specific episodes, and we want to give voice to these students in a safe environment where their opinions can be challenged and perhaps even changed.

During dialogic communication with the participants, we seek to relate the episodes to students' life experiences and how they can simulate the actor's narration to translate their perceptions about well-being and health.

Participants are provided initial training on camera use, visual research ethics, and storytelling short film creation. According to Chan and Sage [34], Digital storytelling is a storytelling method produced by mixing digitized images, texts, sounds, and other interactive elements, and it has been progressively used for social work and healthcare interventions.

Once the topic of the digital story is decided, it is needed to create a script and a storyboard. When writing a script, students decide what their digital story will achieve. The script or storyboard should describe the type of digital story the students will make. They then must record their script and find media for their storyboard to create their video as the final step.

Our ready to validate created "Digital storytelling" digital protocol is available at <https://freeonlinesurveys.com/s/Aimk1INK>.

4 Organizing the Visual Narrative Process

4.1 Training of Students

Students should be familiarized with story elements before starting the workshop of Digital Storytelling to facilitate their understanding of the process.

- What is a Story? As a starting point, Students need to understand why humanity tells stories. They need to identify the story topics, and to identify skills and difficulties they may face when telling a story.
- Atmosphere of the story. Atmosphere of story is the feeling created by mood and tone. It takes the reader to where the story is happening and lets them experience it much like the characters. Participating students need to understand the importance of building well the universe where their story will develop.
- Story's characters. Characters in a story can be either round or flat. A round character usually plays an important role in the story. They are written specifically so audiences can pay attention to them for a specific reason. Flat characters are usually perfunctory. Participants have to understand the difference between them, know what makes a character interesting, and start developing the main character of their story. -The Hero's Journey. The hero's journey (Fig. 1) is a common narrative archetype, or story template, that involves three essential stages: a hero, who goes on an adventure (Departure), learns a lesson and wins a victory with that newfound knowledge (Initiation), and then returns home transformed (Return). Participants must know the steps of the hero's journey and how to use it to tell a story.

- Character trial. The Character Trial is to choose a character, set up a courtroom with a team of defenders, a team of prosecutors, a judge, and a jury. Once participants are used to the idea of putting characters on trial, it can be as short or long as it needs to be.



Fig. 1. Illustration of the hero’s journey [35]

4.2 Steps for Digital Story Process

Digital stories push students to become creators of content, rather than just consumers. It can be created while incorporating the 21st century skills of creating, communicating, and collaborating.

Figure 2 illustrates the steps of the Participatory Research Phase as we chose the digital storytelling as a method for doing the visual narrative in this study.



Fig. 2. Steps in Digital storytelling [36]

- Start with an idea. In our workshop, the story idea should be related to questions connected with the selected episodes of “Everybody Hates Chris”. Once student has an idea, he should: write a proposal, craft a paragraph, draw a mental-map, or use any other pre-writing tool. Graphic organizers (Fig. 3) are a pictorial way of constructing knowledge and organizing information. They help student convert and compress a lot of seemingly disjointed information into a structured, simple-to-read, graphic display. It also helps students generate ideas as they develop and note their thoughts visually.

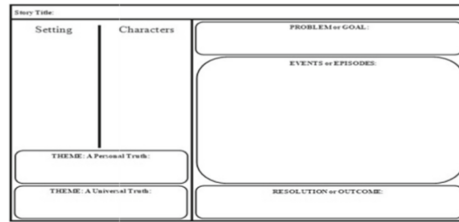


Fig. 3. Digital Story Map [37]

To create the map, the student must concentrate on the relationship between the items and examine the meanings attached to each of them. While creating a map, the student must prioritize the information, determining which parts are the most important and should be focused upon, and where each item should be placed in the map. -Research/Explore/Learn. Students need to research, explore, or learn about the topic to create a base of information on which the digital story will be built. During this process, students learn about validating information and information bias as they dive deeper into a topic.

- Write/Script. If students have a proposal, with a little bit of editing, it can become the introduction. If students research and explore a topic well, the body of the script should fall into place like a jigsaw puzzle. The pieces are already there, students just need to make them fit. A story map (Fig. 3) can be used.
- Story board/Plan. Storyboarding is the first step towards understanding sound and images. It is the plan that will guide decision making about images, video, and sound. Simple storyboards (Fig. 4) will just have room for images/video and the script. More advanced ones might even include room for transitions, and background music.

Image Description/Drawing:	Image Description/Drawing:	Image Description/Drawing:
Image Credit:	Image Credit:	Image Credit:
Spoken Text:	Spoken Text:	Spoken Text:
Written Text:	Written Text:	Written Text:
Music/Sounds:	Music/Sounds:	Music/Sounds:

Fig. 4. Digital Story Storyboard Template [38]

- Gather and create images, audio, and video. Using their storyboard as a guide, students will gather images, audio, and video. Students should use this time to record themselves reading their scripts. Through this step in the process, they become acutely aware of mistakes and poor word choices.
- Put it all together. Students will revise their storyboard and find ways to push the technology and tools. This stage lets students understand what is necessary for a completed project and to push themselves beyond the expectations.

- Share. Sharing online has become deeply embedded in our culture, so as educators, we might as well embrace it. Knowing that other people might see their work often raises student motivation to make it the best possible work that they can do. Review with the school and then look for a way to share students' stories with a broader audience in an event such as Film Festival.
- Reflection and feedback. Too often in education, we do not teach or allow time for reflection and feedback. Students need to be taught how to reflect on their own work and give feedback to others, this is both constructive and valuable.

5 Conclusion

The objective of this research was to create an Intervention protocol to support the design of a telehealth service at school that effectively promotes students' health and wellbeing.

By knowing and understanding adolescents in school environment, we can develop better solutions that strongly contribute to health services development and innovation. The methodology of student-centered approach is central to this research and is expected to provide useful insights for the development and delivery of adolescent telehealth services at school to promote students' well-being. Student's narrative creation in the form of digital stories are potent forces within the lives of adolescents as they shape opinions, assumptions, and alignments with the knowledge.

A novel approach to providing children and adolescents who would otherwise struggle to access care, particularly in rural areas, with an easily accessible source of health care is the digitalization of Brazil's Health at School Program (PSE) supporting telehealth services. It is anticipated to be a source for addressing digital inclusion and multiliteracy access in education, health, and other areas as an innovative method, particularly for the most vulnerable neighborhoods of the city of Sao Paulo, which lack access to telecom signals and are therefore unable to access many services.

Some limitations are expected to be noted. The involved adolescents represent only a tiny subset of the total adolescents at school and may not reflect all adolescents. Furthermore, the recent lockdown periods due to the COVID-19 pandemic made us aware of limiting chances and possibilities for participation using online meetings.

The intervention protocols that were created and adapted during this study, target school and health staff to later apply it with the adolescents in future research. Once interventions are delivered, it will help to explore benefits over time. Moreover, research is needed to examine its impact on health outcomes and user's care experiences.

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References

1. Love, H., Panchal, N., Schlitt, J., Behr, C., Soleimanpour, S.: The use of telehealth in schoolbased health centers. *Glob. Pediatr. Health* **6**, 2333794X19884194 (2019)

2. Williams, S., Xie, L., Hill, K., Mathew, M.S., Perry, T., Wesley, D., et al.: Potential utility of schoolbased telehealth in the era of COVID-19. *J. Sch. Health* **91**(7), 550–554 (2021)
3. World Health Organization. http://www.who.int/school_youth_health/gshi/hps/en/. Accessed 4 Sept 2021
4. Ferolla, L.M.: Efeitos do Programa Saúde na Escola em indicadores municipais de saúde. Universidade de Sao Paulo, Agencia USP de Gestao da InformacaoAcademica (AGUIA) (2019)
5. do Nascimento, A., Gomes, K.C.: A Fonoaudiologia E O Programa Saúde Na Escola Em Um Município Do Sul Do Brasil – Relato De Experiência. In: *As ciências da saúde desafiando o status quo: Construir habilidades para vencer barreiras* 4. Atena Editora, pp. 141–146 (2021)
6. Koepke, S., Denissen, J.J.: Dynamics of identity development and separation– individuation in parent–child relationships during adolescence and emerging adulthood – a conceptual integration. *Dev. Rev.* **32**(1), 67–88 (2012)
7. Ritchie, R.A., et al.: Identity dimensions and related processes in emerging adulthood: helpful or harmful? *J. Clin. Psychol.* **69**(4), 415–432 (2013)
8. Ellis, B.J., et al.: The evolutionary basis of risky adolescent behavior: implications for science, policy, and practice. *Dev. Psychol.* **48**(3), 598–623 (2012)
9. Freire, P.: *Extensão ou Comunicação?* 3rd edn. Paz e Terra, Rio de Janeiro (1977)
10. Eaton, D.K., et al.: Youth risk behavior surveillance – United States, 2011. *Morb. Mortal. Wkly. Rep. Surveill. Summ.* **61**, 1–162 (2012)
11. Woynarowska-Soldan, M., Tabak, I., Doroszewska, A.: The feelings of adolescents connected with medical visits and their perception of the physicians’ behaviour. *Med. Wieku Rozwoj* **18**, 331–342 (2014)
12. Binder, P.E., Moltu, C., Hummelsund, D., Sagen, S.H., Holgersen, H.: Meeting an adult ally on the way out into the world: Adolescent patients’ experiences of useful psychotherapeutic ways of working at an age when independence really matters. *Psychother. Res.* **21**(5), 554–566 (2011)
13. Carcone, A.I., et al.: Provider communication behaviors that predict motivation to change in black adolescents with obesity. *J. Dev. Behav. Pediatr.* **34**(8), 599–608 (2013)
14. Kim, B., White, K.: How can health professionals enhance interpersonal communication with adolescents and young adults to improve health care outcomes?: systematic literature review. *Int. J. Adolesc. Youth* **23**(2), 198–218 (2017)
15. Sommer, M., et al.: Strengthening health care worker engagement with early adolescence in low- and middleincome countries: an overdue area for action. *Int. J. Adolesc. Med. Health* (2020)
16. Alli, F., Maharaj, P., Vawda, M.Y.: Interpersonal relations between health care workers and young clients: barriers to accessing sexual and reproductive health care. *J. Commun. Health* **38**(1), 150–155 (2012)
17. Davey, A., Asprey, A., Carter, M., Campbell, J.L.: Trust, negotiation, and communication: young adults’ experiences of primary care services. *BMC Fam. Pract.* **14**(1) (2013)
18. Wendt, E.K., Lidell, E.A.S., Westerståhl, A.K., Marklund, B.R., Hildingh, C.I.: Young women’s perceptions of being asked questions about sexuality and sexual abuse: a content analysis. *Midwifery* **27**(2), 250–256 (2011)
19. Dawkins-Moultin, L., McDonald, A., McKyer, L.: Integrating the principles of socioecology and critical pedagogy for health promotion health literacy interventions. *J. Health Commun.* **21**(Sup 2), 30–35 (2016)
20. Sykes, S., Wills, J., Popple, K.: The role of community development in building critical health literacy. *Commun. Dev. J.*, 1–17 (2017)
21. Lew-Levy, S., Milks, A., Lavi, N., Pope, S.M., Friesem, D.E.: Where innovations flourish: an ethnographic and archaeological overview of hunter–gatherer learning contexts. *Evolut. Hum. Sci.* **2** (2020)

22. Soleas, E.K.: Expectancies, values, and costs of innovating identified by Canadian innovators: a motivational basis for supporting innovation talent development. *J. Adv. Acad.* **31**(2), 129–153 (2020)
23. Elias, S.: *Origins of human innovation and creativity: breaking old paradigms* (2012)
24. Carr, K., Kendal, R.L., Flynn, E.G.: Eureka!: what is innovation, how does it develop, and who does it? *Child Dev.* **87**(5), 1505–1519 (2016)
25. Rawlings, B., Legare, C.H.: Toddlers, tools, and tech: the cognitive ontogenesis of innovation. *Trends Cognit. Sci.* **25**(1), 81–92 (2021)
26. Rosenberg, H.: Media, teens & children: Consumption, habits and social practices. In: Mann, R., Lev-On, A. (eds.): *Annual Report: The Israeli Media in 2015 Agendas, Uses and Trends*, pp. 70–91. Ariel: New Media Research Institute, Ariel University. (Hebrew) (2016)
27. Valkenburg, P.M., Peter, J.: Online communication among adolescents: an integrated model of its attraction, opportunities, and risks. *J. Adolesc. Health* **48**(2), 121–127 (2011)
28. Ophir, Y.: SOS on SNS: adolescent distress on social network sites. *Comput. Hum. Behav.* **68**, 51–55 (2017)
29. Bombari, D., Schmid Mast, M., Canadas, E., Bachmann, M.: Studying social interactions through immersive virtual environment technology: virtues, pitfalls, and future challenges. *Front. Psychol.* **6** (2015)
30. Ophir, Y., Rosenberg, H., Asterhan, C.S., Schwarz, B.B.: In times of war, adolescents do not fall silent: teacher–student social network communication in wartime. *J. Adolesc.* **46**, 98–106 (2016)
31. Rich, M., Lamola, S., Gordon, J., Chalfen, R.: Video intervention/prevention assessment: a patient-centered methodology for understanding the adolescent illness experience. *J. Adolesc. Health* **27**(3), 155–165 (2000). 11 The full text of this article is available via JAH Online at <http://www.elsevier.com/locate/jahonline>
32. Wallerstein, N., et al.: Engage for equity: a long-term study of community-based participatory research and community-engaged research practices and outcomes. *Health Educ. Behav.* **47**(3), 380–390 (2020)
33. Pandian, A., Baboo, S.B., Lim, J.Y.: Digital storytelling: engaging young people to communicate for digital media literacy. *Jurnal Komunikasi Malays. J. Commun.* **36**(1), 187–204 (2020)
34. Chan, C., Sage, M.: A narrative review of digital storytelling for social work practice. *J. Soc. Work. Pract.* **35**(1), 63–77 (2019)
35. <https://www.yourheroicjourney.com>
36. <https://samanthamorra.com>
37. <https://templatelab.com/story-map-templates/>
38. <https://www.template.net/business/storyboard-templates/digital-storyboard-template>