Computer Coding for Early Psychosis—An Innovative Pilot Study

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This is to our knowledge the first initiative to teach computer coding to individuals with psychosis. We have demonstrated that such skills, formerly considered too complex, can be adapted for people with psychiatric problems, such as psychotic disorders, and help them develop school and work goals. This pilot study was done with Kids Code Jeunesse, a not-for-profit organization that teaches computer coding to elementary and high school students and teachers across Canada.

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ABSTRACT

People with psychotic disorders are at higher risk of not completing an educational degree and tend to get low-wage jobs. We offered computer coding classes to 14 participants. The training was deemed feasible, acceptable, and appeared to increase their motivation for school or work, not only in computer-related domains.

Keywords: early psychosis, computer coding, motivation, self-esteem, computer training

RÉSUMÉ

Les personnes avec un trouble psychotique sont à haut risque de ne pas terminer leur diplôme et d'obtenir des emplois sous-payés. Nous avons offert des cours de programmation informatique à 14 participants. La formation a été évaluée comme faisable, acceptable tout en semblant améliorer la motivation pour les études et le travail, et ce, pas seulement dans le domaine informatique.

Mots clés : psychose débutante, programmation informatique, motivation, estime de soi, formation en informatique

BACKGROUND

The past decades have seen the exponential development of computer-engineered technologies, such as apps, social media, video games, search tools, and online banking, to name a few. Recent initiatives to teach computer coding/programming to students starting as early as elementary school have sprouted. Results from these initiatives have been startling, with family members and children mentioning a high satisfaction with the training (98%) in a recent survey of 918 kids receiving the training online during the spring 2020 pandemic. Not only have students learned basic, and at times even complex, computer programming, some of the more vulnerable students with poor school achievement and motivation thrived in these classes and found a renewed interest for education.

If computer programming can help vulnerable students, could it also help youth who are even more vulnerable and who have quit school because of a severe mental illness such as schizophrenia? Youth with psychotic disorders often have difficulties staying in school once they have experienced a first episode of psychosis. In fact, less than 60% of youth with a psychotic disorder obtain a high school diploma (Goulding, Chien, & Compton, 2010). These difficulties are in part linked with cognitive deficits, such as poor concentration, poor memory, and difficulties completing tasks, but also to negative symptoms such as poor motivation and lack of pleasure. As a consequence, youth who have experienced a psychotic disorder are at high risk of either becoming unemployed, or of having low-level entry jobs at minimal pay. Recent statistics suggest that 80% of people with a severe mental illness not receiving specialized employment services are unemployed, compared to 50% of those receiving such services (Corbière et al., 2010).

The CPA Guidelines for the Treatment of Schizophrenia (Lecomte et al., 2017) recommend that youth with a psychotic disorder be offered training and support in their education as well as in the vocational goals.

Supported education programs, although scarce, can be offered to help those wishing to complete a degree. However, these programs typically only focus on mandatory classes, such as math, history, or language. Computer coding could help develop skills that increase one's education and employment opportunities, as well as increased motivation to continue one's education.

OBJECTIVES

This study's objectives were threefold:

1. Determine the feasibility of adapting and delivering a computer coding training typically offered in schools to youth with a psychotic disorder.
2. Measure the acceptability, from the youth's perspective, of the training.
3. Estimate the potential impact of such training on the youth's self-esteem, motivation, and education/vocational aspirations.

METHOD

Design

This was a mixed-method pilot study with pre–post measures as well as a three-month telephone follow-up.

Participants were recruited from two early psychosis clinics in Montreal. Inclusion criteria comprised (a) receiving services for a psychotic disorder, (b) currently not in school and not working, (c) aged between 16 and 30, (d) capacity to consent to the study, and (e) fluent in French (the language in which the training was offered). A total of 14 participants took part in this pilot study, receiving the training in three different classes. The average age was 25 (*SD* 3.4), six were native Canadians (four Caucasian, one Arab, and one Caribbean), three were from Africa, four from Haiti, and one from Asia. French was the mother-tongue for 64% of our sample (n = 9).

Training

The computer coding training was offered by Kids Code Jeunesse (KCJ), a not-for-profit organization that teaches computer coding to elementary and high school students and teachers across Canada. The trainer was a qualified KCJ trainer who had previous knowledge in mental health. The training was offered in small classes of 4 to 6 participants. In the context of this pilot, two potential projects were proposed (build a website or develop a video game) and participants voted on which project they would accomplish. Although they all had their personal project, everyone in the class worked on the same type of programming (i.e., website or game).

Measures

Feasibility. Feasibility was measured at each session, via feedback collected at the end of each class, allowing the trainer to adjust the training for the next session (e.g., speed or slow the pace, give more examples).

Acceptability. Acceptability was measured by the actual presence in the training (attendance) as well as individual qualitative interviews conducted with each participating youth in the coding training. At the end of the training, each participant met with a research assistant to answer open-ended questions pertaining to their experience with the training (e.g., what they liked, disliked, etc.). The answers were audio recorded and transcribed.

Potential impact. Although the study's design does not allow assessment of the impact on psychosocial measures, we measured concepts that we believed could be affected by the training, namely (1) self-esteem, which was assessed with the *Self-Esteem Rating Scale-Short Form* (Lecomte, Corbière, & Laisné, 2006), a 20 item questionnaire validated with people with severe mental illness. The scale measures both positive self-perception and negative self-perception. (2) Work and school motivation were assessed with The *Motivation to Find a Job* or *Motivation for School* questionnaires (Villotti, Corbière, Zaniboni, Lecomte, & Fraccaroli, 2015). Both measures consist of a single conceptual dimension and seven items relating to the participants' motivation to either find a job or go back to school, measured on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree).

This project has been approved by the Research Ethics Board (REB) of the CIUSSS-de-l'Est-de-l'Île-de-Montréal, as well as by the REB of the Centre Hospitalier de Montréal (CHUM). All participants signed an informed consent form prior to the interviews and administration of questionnaires.

RESULTS

In terms of *feasibility*, the training consisted of two formats: (1) the first class received 15 hours (6 sessions of 2 hours and a final session of 3 hours), and (2) the classes that followed received 8 hours (4 sessions of 2 hours) to complete their project. These different formats were based on the participant feedback resulting from the training sessions. Participants were all able to complete their project and the trainer was able to adjust the training to the pace of each class as needed. Feedback addressed, for example, the pace or clarity of explanations by the trainer ("explains really well"), that "all is well," "nothing to change," or "starting to get better at scratch program."

As for *acceptability*, out of the initial participants who agreed to take part (n = 26), 13 never showed up, 6 attended all sessions, and 7 missed at least one class. Three months after the training, the participants were contacted again. The results are presented in Table 1. The comments mention a high appreciation for the training and motivation to complete a degree (high school or computer technician) for most of the sample.

Regarding *potential impact*, our sample was too small to detect any statistically significant results. Without a control group, even significant results would be difficult to interpret as being linked to the training. Nonetheless, we can see in Table 2 that self-esteem (negative scale, $p = 0.18$), work motivation and school motivation appear to have improved, but not significantly ($p = 0.15$ and $p = 0.10$). When looking at the effect sizes we notice a small–medium effect size for each of these variables, suggesting noticeable improvements between before and after the training.

Table 1

Qualitative Data Collected at T2 (3 Months Follow-up)*

Question	Answers (n = 14)
Educational goals	To complete my high school degree (n = 4), To complete a technical or college degree (n = 2), To get a college diploma in computers, computer programming (n = 4)
Work goals	To work in computer programming (n = 4) To get a part-time job (n = 4) Work as nurse's-aid (n = 1)
Satisfaction with training	Perfect, great, loved it, fun (n = 10) Useful (n = 1) OK (n = 1)
How was it useful?	Got everything I wished for (n = 1) Learned new things (how to build a robot, new notions, new learnings, how to code; n = 9) Improved my memory (n = 1) Developed interest for the field (n = 1) Met new people (n = 1)
What was liked most?	The trainer was easy to access, nice, helpful (n = 2) Structure of the sessions, mixing theory and practice (n = 2) Technical guidance, the robot (n = 3) Working on a computer (n = 1)
What should be changed?	More time working in teams (n = 2) Longer training, more time (n = 3), too long (n = 1) Nothing, training was great (n = 8)

**Note*. Not all participants answered all the questions—missing data is possible.

Table 2

Means and Standard Deviations for the Self-Esteem and Motivation

	T0 (pre) Mean (*SD*)	T1 (post) Mean (*SD*)	*p*	*E.S. (d)*
Self-esteem (positive scale)	46.3 (16.3)	45.1 (16.0)	0.68	0.11
Self-esteem (negative scale)	-54.9 (10.5)	-51.9 (14.5)	0.19	0.37*
School motivation	29.6 (11.5)	35.9 (12.9)	0.10	0.46*
Work motivation	28.4 (12.3)	35.1 (12.2)	0.15	0.41*

Notes. *small–medium effect size

DISCUSSION

This pilot study aimed at determining the feasibility, acceptability, and potential impact of a computer coding training for young adults with a psychotic disorder. The study demonstrated that the training was feasible, and that more than one format is possible depending on the group (some preferred more hours, others more intensive sessions but shorter in duration). In terms of acceptability, the training was highly appreciated, with some participants even asking to participate at more than one session (though not granted within the study).

One interesting result is that 10 out of 14 participants mentioned an educational goal, whereas they were not actively in school at the time of the training. Close to one-third (n = 4) mentioned a computer-related goal, both in terms of education and future work field. The qualitative information collected offers a really positive view of the experience. Most of the participants were extremely satisfied by the knowledge acquired, the skills and personal qualities of the trainer, and the actual tasks they completed. Although the length of the activity did not meet consensus, with some wishing for more time and others for less, the only other suggestion for improvement was to better use the small class format by perhaps having people work in teams more often.

This is one of the first training programs offered to young adults with a severe mental illness that focused on computer programming (and not on how to use a computer for word processing). These results are promising as they pave the way for practical and contemporary training offered to people with a psychotic disorder, who are at greater risk of unemployment, low educational achievement, and social isolation. Computer coding might enable better employment opportunities or, at least, increased motivation for educational goals. The preliminary results of this study may eventually be reinforced by larger studies with a randomized controlled design.

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