

## Brief Report

# Understanding access and use of technology among youth with first-episode psychosis to inform the development of technology-enabled therapeutic interventions

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## Abstract

**Aim:** Computers, video games and technological devices are part of young people's everyday lives. However, their use in first-episode psychosis (FEP) treatment is rare. The purpose of this study was to better understand the access and use of technology among individuals with FEP, including gaming activities, to inform future development of technology-enabled therapeutic applications.

**Methods:** Self-administered survey on use of technological tools in 71 FEP individuals.

**Results:** PCs/laptops were used by all participants; cellphones/

smartphones by 92%, consoles by 83% (mainly male and younger participants). Women texted and used social networks more frequently; men played games (mainly action) more often. The younger individuals reported playing games frequently (32% daily) with less use of the Web and social networks (favourite: Facebook).

**Conclusions:** These data will be useful for developing Web-based psychoeducation tools and cognitive remediation video games for youth with FEP.

**Key words:** eMental health, first-episode psychosis, psychosocial intervention, serious video game, Web-based.

## INTRODUCTION

Computers, mobile devices and video games are now a part of everyday life, especially for young people. Surveys indicate that 93% of adolescents have computers or have access to one at home, 74% to the Internet and 94% to social media accounts.<sup>1,2</sup> A Canadian survey of high school students ( $n = 2382$ ) reported that 85% played video games in the past year, and 18.3% on a daily basis.<sup>3</sup> In other countries, online gaming is even more prevalent. Indeed, 83% of Singapore high school students ( $n = 3034$ ) reported playing video games approximately 20 h/week.<sup>4</sup>

Increasing attention has been placed on the potential benefits of videogaming.<sup>5</sup> It impacts on

cognition, behaviour, perception, affect and motivation,<sup>6</sup> and is associated with better visual spatial abilities,<sup>7</sup> selective attention in children,<sup>8</sup> and reading ability in children with dyslexia.<sup>9</sup> Cognitive improvements are not restricted to action games alone; games focusing on spatial working memory and visual matching are also associated with cognitive improvements.<sup>10</sup> Serious video games (designed for training, education and therapy)<sup>11</sup> have been developed for educational purposes and to treat different health problems and mental disorders such as child anxiety disorders, depression<sup>12</sup> and impulse control disorder,<sup>13</sup> and to address various fears and phobias (with simulated environment).<sup>14,15</sup> Biofeedback has been used to help patients learn how to control impulsivity and aggressiveness<sup>13</sup> by

recording patient's vital signs during sessions and adjusting the game accordingly. There is, however, a lack of research on the use of video games for delivering mental health interventions to young people, particularly those affected by first-episode psychosis (FEP).

Video games offer a promising vehicle to address neurocognitive functioning, which is generally lower in FEP,<sup>16</sup> responds poorly to medication,<sup>17–19</sup> and represents a major obstacle to employment and education achievements. Meta-analytic evidence supports the effectiveness of cognitive remediation on cognition in patients with schizophrenia, particularly when it is combined with other forms of psychiatric rehabilitation<sup>20,21</sup> (small to medium effect size). Moreover, cognitive remediation improves real-world behaviour, particularly when supplemented with functional skills training.<sup>22</sup> Furthermore, the social aspect of videogaming activities has changed in the last years, whereby more than 70% of gamers play with other players online<sup>5,23</sup> and sometimes engage in conversations.

Despite the potential of video games to enhance social and cognitive capacities, many currently available cognitive remediation tools are outdated in terms of technologies and have not been designed in attractive and engaging formats for youth. Combining cognitive remediation tools with current gaming technology offers a promising avenue to improve cognitive deficits and ultimately promote social and functional recovery in FEP.<sup>24</sup> However, limited information exists on the extent to which patients with FEP use various technology devices, and engage in gaming activities and the types of gaming activities they prefer. This type of information can be helpful in the design of future computer-based gaming interventions. Therefore, we conducted a survey to document their technology use (including gaming activities) and preferences.

## METHODS

During summer 2012, participants were recruited from the waiting room area of a specialized FEP programme (JAP clinic, University of Montreal Hospital Center (CHUM)) serving youth aged 18–30 at admission, and situated in an urban North American city covering a range of poor and middle-class populations. Patients who attended clinic appointments during the study period were invited to answer a survey on their access and use of technology and related activities. Participants filled the questionnaire on an electronic tablet or using pen

and paper format according to their preference, with the help of a research assistant if needed. To preserve confidentiality, no nominal data were used. Simple descriptive statistics were extracted from the data using JavaScript. To examine the differences between the observed percentages, with a contingency table, we used the likelihood ratio  $\chi^2$  test. Significance was set at  $P < 0.05$  (two-tailed test). The CHUM's research ethics and scientific board approved the present study.

## RESULTS

Eighty-two individuals were approached, of which 75 (85%) consented and 71 completed the survey. Those who refused were similar in terms of age, gender and level of education when compared to the sample. Participants were 74.6% male ( $n = 53$ ) aged  $\bar{X} = 26$  whereas the mean age of female participants was 25; 78.8% of the sample ( $n = 56$ ) was within the age range of 18–29. In terms of education, 70% ( $n = 50$ ) completed high school. These sociodemographic characteristics are consistent with the literature in terms of treated incidence rates being higher in men than women.<sup>25</sup> Moreover, the study sample was similar to the whole clinic population, as 80% of the clinic's population was male, 69% had completed high school, and was aged 22.6 years old at admission.<sup>26</sup> In this survey, participants could be at any stage of their 5-year treatment in the programme explaining the age difference.

The majority of participants (96%,  $n = 68$ ) reported frequent use (i.e. daily to two to three times per week) of laptops and desktop computers, and 70% ( $n = 50$ ) for cellphones and smartphones. The majority (83%;  $n = 59$ ) had previously used game console devices; however, only a third of the participants reported frequent use of such devices, with more men significantly reporting frequent use than women (38%,  $n = 20$  vs. 6%,  $n = 1$ , respectively;  $\chi^2(1) = 8.99$ ;  $P = 0.007$ ) as well as younger individuals (17–24 years old: 41%; 25–29 years old: 30%; 30–39 years old: 7%;  $\chi^2(2) = 6.73$ ;  $P = 0.035$ ). Most (94%,  $n = 67$ ) considered their computers and laptops to be their favourite devices. They accessed their favourite technology devices in many places, but two-thirds accessed them at home (Table 1).

More than two-thirds (68%,  $n = 48$ ) reported occasional (at least once a week) or frequent (at least one to three times per day) use of social media for staying in communication with friends (87%,  $n = 62$ ) and families (69%,  $n = 49$ ) or to participate in group discussions (46%,  $n = 33$ ). More educated individuals were more likely to use social media

TABLE 1. Use of technological tools in an early psychosis sample by gender, age and education level

Technological tool	Total		Sex		Age (years)						Level of study						P-value
			Male		17-24		25-29		30-39		Secondary		College		Post-college		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Already used	71	100	18	100	29	100	27	100	15	100	34	100	13	100	24	100	-
PC/laptop	65	92	18	100	27	93	24	89	14	93	33	97	11	85	21	88	0.239
Cellphone/smartphone	59	83	12	67	26	90	21	78	12	80	32	94	12	92	15	63	<b>0.005</b>
Console	26	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tablet PC	68	96	17	94	28	97	26	96	14	93	32	94	12	92	24	100	0.274
Frequent use	50	70	15	83	17	59	22	81	11	73	23	68	9	69	18	75	0.826
PC/laptop	21	30	1	6	12	41	8	30	1	7	13	38	6	46	2	8	<b>0.010</b>
Cellphone/smartphone	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Console	62	87	17	94	24	83	25	93	13	87	27	79	12	92	17	71	0.270
Tablet PC	58	82	15	83	22	76	23	85	13	87	21	62	10	77	20	83	0.172
App used frequently	48	68	14	78	17	59	19	70	12	80	15	44	9	69	19	79	<b>0.019</b>
Phone	36	51	12	67	13	45	18	67	5	33	11	32	7	54	12	50	0.260
Web	33	46	6	33	15	52	12	44	6	40	13	38	7	54	3	13	<b>0.017</b>
Social networks	12	17	2	11	2	7	7	26	3	20	2	6	4	31	2	8	0.084
Texting	35	49	5	28	14	48	13	48	8	53	8	24	6	46	5	21	0.238
Games	35	49	3	17	13	45	15	56	7	47	11	32	6	46	5	21	0.275
Skype	37	52	9	50	13	45	14	52	10	67	7	21	3	23	5	21	0.982
Favourite type of games	32	45	10	56	14	48	11	41	7	47	10	29	2	15	5	21	0.538
Adventure	39	55	5	28	14	48	17	63	8	53	13	38	4	31	5	21	0.359
Role playing	47	66	11	61	21	72	20	74	6	40	17	50	7	54	4	17	<b>0.014</b>
Brain teasers	50	70	13	72	18	62	19	70	13	87	21	62	10	77	19	79	0.303
Simulation	5	7	2	11	1	3	4	15	0	0	2	6	1	8	2	8	0.932
Strategy	1	1	1	6	0	0	0	0	0	0	1	3	0	0	0	0	0.475
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Social networks used more frequently	10	14	3	17	3	10	6	22	1	7	4	12	3	23	3	13	0.618
Facebook	24	34	5	28	14	48	8	30	2	13	12	35	6	46	6	25	0.416
Twitter	40	56	11	61	16	55	17	63	7	47	15	44	10	77	15	63	0.090
Myspace	29	41	5	28	8	28	12	44	9	60	9	26	10	77	10	42	<b>0.006</b>
LinkedIn	37	52	14	78	16	55	15	56	6	40	18	53	6	46	13	54	0.889
Autre	32	45	8	44	13	45	9	33	10	67	14	41	8	62	10	42	0.112
Desired discussion groups	48	68	8	44	13	45	9	33	10	67	14	41	8	62	10	42	0.419
Sports	24	34	5	28	14	48	8	30	2	13	12	35	6	46	6	25	0.416
Culture	40	56	11	61	16	55	17	63	7	47	15	44	10	77	15	63	0.090
Politics	29	41	5	28	8	28	12	44	9	60	9	26	10	77	10	42	<b>0.006</b>
Health	37	52	14	78	16	55	15	56	6	40	18	53	6	46	13	54	0.889
Mental health	32	45	8	44	13	45	9	33	10	67	14	41	8	62	10	42	0.112
Where are the tools used	48	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At home	31	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At friend's home	41	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At parent's home	24	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At work	31	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At internet cafe	18	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At all these places	23	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency of game use	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Every day	17	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Occasionally	17	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rarely	21	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Never	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

frequently (secondary school: 44%; college: 69%; post-college: 79%;  $\chi^2(2) = 7.96$ ;  $P = 0.019$ ). When asked regarding their desire to participate in various online discussion topics (e.g. sports, culture, politics, health, mental health), almost half of the sample selected mental health ( $n = 32$ , 45%). Facebook was the most frequently accessed social media site (70%,  $n = 50$ ); furthermore, 75% ( $n = 53$ ) identified Facebook as their favourite social media.

Almost half of the sample (46%,  $n = 33$ ) reported using their devices for gaming activities from once a week to thrice a day, whereas 30% reported never playing computer games. Sixty-six per cent of the sample ascribed action games as their favourite, whereas adventure (49%), role playing (49%), brain teasers (52%), simulation (45%) and strategy (55%) games were appreciated at approximately the same level. Men were more likely than women to prefer adventure (57% vs. 28%;  $\chi^2(1) = 4.59$ ;  $P = 0.032$ ), role playing (32% vs. 3%;  $\chi^2(1) = 11.02$ ;  $P = 0.001$ ) and strategy games (64% vs. 28%;  $\chi^2(1) = 7.296$ ;  $P = 0.007$ ). There was a trend for younger participants to prefer action games (17–24 years old: 72%; 25–29 years old: 74%; 30–39 years old: 40%;  $\chi^2(2) = 5.584$ ;  $P = 0.061$ ).

## DISCUSSION

To our knowledge, this is among the first documented quantitative studies on access and use of technology among youth with early psychosis. Their access to computers, cellphones or social media seems similar to the general population of the same age.<sup>1,2</sup> Almost half used their technology devices for different types of gaming activities (action, adventure, role playing, brain teasers, simulation and strategy) and the proportion of playing video games on a daily basis seems higher (almost double) when compared to Turner's study on a Canadian high school population,<sup>3</sup> with the younger participants playing video games more frequently compared to their older counterparts. Our findings that men played video games more than women are also supported within the general population.<sup>27</sup> However, research suggests that gender differences in terms of gaming may be related to age<sup>27</sup> similar to the present study.

There are several limitations to this study. First, we did not collect sociodemographic information (e.g. socioeconomic status, employment/education status, or ethnicity and culture) which could help assess the representativeness of our sample in relation to the FEP population, as well as trends relating to the association of these factors with access and patterns of use. Moreover, the survey was not

designed to elicit information on the willingness of participants to receive psychological and social interventions using computer gaming activities, and the types of games they would prefer in this regard. Regarding statistical analyses, the level of significance should be considered with caution due to the sample size and to the low occurrence in some reported categories. Furthermore, some findings associated with education levels could be influenced by age as many younger individuals did not yet reach the age of college or university education. Finally, the findings should be interpreted while taking into account the survey chronological context. Technology use is rapidly increasing in North America with increased access, and the sense of mastery with it increases with experience of utilization. For example, at the time of conducting the surveys (summer 2012), approximately half of the sample was using text messaging; and most youth did not feel comfortable completing the survey on electronic tablets. This may no longer be an issue as technology becomes more available. However, this population seems to use technological devices and computer games similar to their peers without mental illness if not more, when compared to surveys done on the general youth population in the same period. Therefore, as technology becomes more available, its therapeutic potential will become even more relevant. Furthermore, youth have expressed interest in online discussion groups about health (mainly women) and mental health, which emphasizes the relevance of using such tools for mental health interventions.

## CONCLUSION

An important proportion of FEP youth have access to and are using different technological devices in their everyday life probably as much if not more than the general population of similar age. Their use is diverse and appears to vary in relation to gender, age and possibly level of education. This information will allow developers to better address specific needs and preferences in the design of future technology-enabled interventions (including computer-based gaming activities) to address cognitive deficits, social interaction difficulties and behavioural concerns in young people affected by mental disorders.

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