A comparison of virtual reality and active video game usage, attitudes and learning needs among therapists in Canada and the US

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***Abstract*—Differences in health care funding and policies between the United States and Canada may influence uptake of and attitudes towards virtual reality (VR) and active video gaming (AVG) systems by physical (PTs) and occupational therapists (OTs) in each country. The purpose of this study was to undertake a cross-country comparison of VR/AVG uptake to inform the content of educational interventions designed to promote implementation of these technologies into practice. A cross-sectional online survey that included the Assessing Determinants of Prospective Take-up of Virtual Reality (version 2; ADOPT-VR2) Instrument was conducted in 2014-2015 (Canada) and replicated in 2017-2018 (US). Recruitment took place via convenience and snowball sampling, using email, social media and newsletter postings. Therapists in the US reported greater past experience with, current use of, and intention to use VR/AVGs than did those in Canada. They also rated facilitators more positively and barriers less negatively. Use of customized VR systems was low, with specific system prevalence differing between countries. The most frequently used AVG systems, populations and settings of use, functional goals, predictors of use, learning needs and preferred forms of support were similar between countries. These similarities support the generalizability of educational interventions for both countries. Materials to be developed will focus on non-customized AVG systems. Subsequent work will examine how uptake relates to country-specific health care funding and policies, probe differences in learning needs between therapists with experience using customized versus non-customized VR/AVG systems, and extend the survey to other countries where VR/AVG use is prevalent.**

***Keywords*—virtual reality, active video games, rehabilitation, survey, knowledge translation**

Introduction

In tandem with increasing evidence to support the use of virtual reality (VR) and active video gaming (AVG) platforms in rehabilitation is the familiar challenge of how to translate this evidence into clinical practice. These knowledge translation (KT) efforts can be facilitated by a more thorough understanding of the current state of VR/AVG implementation, including clinicians' attitudes towards use and predictors of use. This information can illuminate gaps between evidence and practice, inform implementation planning, direct the content of educational efforts towards identified learning needs and identify directions for future research. In the North American context, exploring similarities and differences between Canada and the US can inform efforts to make KT research priorities applicable for both countries.

Few KT resources or professional supports for VR/AVG use exist for physical therapists (PTs) or occupational therapists (OTs) in either country. While technology use and development has been identified as a research priority by the National Institutes of Health Research Plan on Rehabilitation [1], the extent to which instruction about these technologies is included in entry-level training in either physical or occupational therapy in the US is unknown. Efforts to facilitate adoption in clinical practice include those by the American Physical Therapy Association's (APTA) Frontiers in Rehabilitation, Science, and Technology (FiRST) Council, whose goals are to promote technological innovation in rehabilitation and to leverage technological discoveries to advance physical therapist practice, education, and research [2]. In addition, APTA's Health Policy Section has a technology Special Interest Group, which has hosted a 'Technopalooza' event at the association's Combined Sections Meeting. The American Occupational Therapy Association has technology coordinators within each of their Special Interest Sections. A rudimentary search found no similar efforts in the PT or OT realm in Canada.

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Exploring inter-country differences is important because the US is the biggest predicted contributor ($4.3 billion) to the current $11.4 billion worldwide spending on virtual and augmented reality [4]. US spending specific to VR in physical rehabilitation contexts is projected to grow by 152% by 2021 [4]. Identifying differences between Canada and the US can help to illuminate factors contributing to these expenditures. Differences in health care funding policies between Canada's publicly-funded system and the US' private payer system may produce greater access to novel health care technologies for clinicians in the US as compared to those in Canada [3]. Vendors, such as Hocoma, the company behind the VR robotic devices Lokomat and Armeo, have also identified the larger customer base in the US. Hocoma has five clinical partners in the US, and none in Canada [5].

The purpose of this paper is to compare the extent, nature and determinants of use, and learning needs related to VR/AVG use among PTs and OTs practicing in the US and Canada to inform subsequent educational, implementation and research efforts.

I. METHODS

A. Study design

This paper reports findings from a cross-sectional online US survey and compares these findings to the Canadian survey results reported by Levac et al. [6].

B. Recruitment

In Canada, recruitment took place in coordination with professional networks, associations and/or colleges as permitted, as described in [6]. In the US, participants were recruited via e-blasts containing a web link and information about the open survey to PTs registered in Ohio and Washington, the 2 states for whom therapists' email addresses could be publicly obtained. Survey information was also disseminated on the national NeuroPT listserv, via newsletter or e-blast by the APTA Academy of Pediatrics, the APTA of California and Nevada, PT and OT associations in North Carolina and Wisconsin, and by the APTA of Massachusetts Neurology and Pediatric Special Interest Groups. Social media postings and emails through the authors' professional and research networks extended these efforts.

In both countries, we were interested in the experiences and needs of PTs and OTs with and without VR/AVG experience. Participants completed an IRB-approved online informed consent process. Participants were told the approximate length of time to complete the anonymous survey (10-20 minutes), where the data would be stored, and the purpose of the study. Participants had the option of leaving contact information to be entered in a draw to win 1 of 5 $50 gift cards.

C. Survey design

Initial survey development and pre-testing is described in the Canadian report [6]. To gather information on VR/AVG usage habits, the survey requested information about participant demographics, experience with VR/AVGs, and learning needs and priorities. After participants identified the VR/AVG systems with which they were familiar, subsequent questions focused on those systems. A dichotomous 'experience with VR/AVG' question delineated participants into two groups based on who had ('yes') and who had never ('no') used VR/AVGs in their clinical practice. Those reporting no experience were asked for their opinion on VR/AVG systems in general.

The remainder of the survey was based on the Assessing Determinants of Prospective Take-up of Virtual Reality (ADOPT-VR2) Instrument, which assesses the factors influencing therapists' adoption of VR/AVGs using a decomposed Theory of Planned Behavior (DTPB) approach [7]. The ADOPT-VR2 has established face and content validity, and high internal consistency (Cronbach's alpha=0.876) [7], as well as demonstrated responsiveness [8]. The US survey used a shortened version of the ADOPT-VR2 (48 items instead of 54; removed items were deemed redundant based on Canadian survey results), to reduce participant burden. The ADOPT-VR2 assesses eleven theoretical predictors of behavioral intention to use VR/AVGs evaluated on a 10-point scale with anchors on extreme values [7]. These constructs are grouped into three composites: 1) Attitudes: Perceived Usefulness, Perceived Ease of Use, Compatibility; 2) Social Norms: Peer Influence, Superior Influence, Client Influence; and 3) Perceived Behavioral Control: Self Efficacy, Facilitating Conditions & Barriers. These composites allow for analysis of the predictive influence of each variable on adoption behavior. Items were not randomized. Two open-ended questions asked for participants' perspectives on the most significant barrier and facilitator to VR/AVG use in clinical practice.

D. Analyses

Descriptive statistics, including counts, proportions and measures of central tendency, were applied to nominal and interval data as appropriate. The summative response scale data from the ADOPT-VR2 were treated as interval data because of the nature of the construct derivations (requiring the summation and averaging of multiple items measuring a single construct to yield a meaningful mean score [9]), and because the scale was designed with anchors only on extreme values, which enabled respondents to select a position on the scale as an interval-scale proxy [10]. Assumptions for parametric analyses were satisfied. Linear regression was employed for predictive analysis of ADOPT-VR2 constructs with respect to behavioral intention to use VR/AVGs. A separate model was used for each ADOPT-VR2 variable, per country and VR/AVG experience level. Respondents with missing data on the VR/AVG experience/no experience item were omitted from these subgroup analyses. Results were considered significant for $p < 0.003$ (Bonferroni adjusted).

II. RESULTS

Results are reported using the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) recommendations [11]. The survey platform (Fluidsurveys) was unexpectedly taken offline when institutional access was changed to another company. As such, view rates and participation rate data were unavailable.

A. *Participant demographics and VR/AVG usage characteristics*

Tables 1 and 2 illustrate that respondents in Canada and the US had similar demographic characteristics with regards to practice settings and client age ranges. Differences were observed between the samples in terms of proportion of PT/OT respondents and level of education, reflecting the Doctor of Physical Therapy level of training in the US versus the MSc level in Canada. The US sample had a greater proportion of respondents with clinical experience using VR/AVGs and currently using VR/AVGs. Fig. 1 illustrates that respondents in both countries indicated most frequently that the systems to which they had access at work were the Wii, WiiFit and Kinect. With respect to rehabilitation-specific systems, more US respondents than Canadian respondents had access to Lokomat, Armeo and Timocco systems, while more Canadian respondents had access to GestureTek and Jintronix, although the proportion of respondents with access to each was low.

TABLE I. PARTICIPANT DEMOGRAPHICS

	Canada NO VR exp. N=591	***US NO VR exp. N=195***	***Canada VR exp. N=503***	***US VR exp. N=357***
Clinical Experience				
< 2 years	68 (11.5%)	80 (41.0%)	65 (13.0%)	107 (30.0%)
2 – 20 years	360 (60.9%)	130 (66.7%)	326 (64.8%)	238 (33.6%)
> 20 years	189 (32.0%)	47 (24.1%)	139 (27.6%)	66 (18.5%)
Level of Education				
Diploma	14 (2.4%)	0 (0%)	14 (2.8%)	4 (1.1%)
Bachelor Degree	317 (53.6%)	22 (11.3%)	240 (47.7%)	45 (12.6%)
Masters/Doctoral/	244 (41.3%)	167 (85.5%)	234 (46.5%)	287 (80.4%)
Other	16 (2.7%)	6 (3.1%)	15 (3.0%)	21 (5.9%)
Age of Clients				
Birth to 19 years	500	118	549	241
19 – 65 years	3332	86	264	203
> 65 years	300	75	225	204
No response	13	8	7	4
Clinical Practice				
Academic	10 (1.7%)	16 (8.2%)	15 (3.0%)	11 (3.1%)
Cardiovascular	19 (3.2%)	0 (0%)	7 (1.4%)	2 (0.6%)
Metabolic	63 (10.7%)	2 (1.0%)	31 (6.2%)	8 (2.2%)
General Health	112 (18.9%)	17 (8.7%)	74 (14.7%)	59 (16.5%)
Geriatrics	6 (1.0%)	1 (0.5%)	3 (0.6%)	0 (0%)
Mental Health	146 (24.7%)	40 (20.5%)	64 (12.7%)	44 (12.3%)
Musculoskeletal	36 (6.1%)	21 (10.8%)	97 (19.3%)	101 (28.3%)
Neurological	122 (20.6%)	27 (13.8%)	147 (29.2%)	47 (13.2%)
Pediatrics	8 (1.4%)	2 (1.0%)	5 (1.0%)	5 (1.4%)
Vocational Rehab	45 (7.6%)	7 (3.6%)	31 (6.2%)	14 (3.9%)
Other	27 (4.6%)	62 (31.8%)	27 (5.4%)	66 (18.5%)
Clinical Practice Settings				
Academic	10 (1.7%)	17 (8.7%)	3 (0.6%)	24 (6.7%)
Assisted Living	28 (4.8%)	6 (3.1%)	14 (2.8%)	10 (2.8%)
Community/Home	108 (18.3%)	18 (9.2%)	70 (14.0%)	35 (9.8%)
Hospital	189 (32.0%)	21 (10.8%)	143 (28.4%)	62 (17.4%)
Private Clinic	87 (14.7%)	23 (11.8%)	46 (9.1%)	30 (8.4%)
Rehab Center	71 (12.0%)	11 (5.6%)	156 (31.0%)	82 (23.0%)
Research	4 (0.7%)	2 (1.0%)	5 (1.0%)	4 (1.1%)
School	32 (5.4%)	20 (3.4%)	20 (4.0%)	12 (3.4%)
other	38 (6.4%)	16 (10.4%)	23 (4.6%)	37 (10.4%)
N/A	24 (4.1%)	61 (31.3%)	23 (4.6%)	61 (17.1%)
Profession	OTs – 301 (50.9%) PTs – 290 (49.1%)	OTs – 38 (19.5%) PTs – 111 (56.9%)	OTs – 272 (54.1%) PTs – 228 (45.3%)	OTs – 96 (26.9%) PTs – 215 (60.2%)

TABLE II. VR/AVG USAGE CHARACTERISTICS

Characteristic	**Country**	
	Canada	***US***
Respondents with VR/AVG experience	46%	64%
Respondents Currently using VR/AVGs	12%	31%
Frequency of Use		
Daily	1.4%	6.9%
Weekly	12.3%	11.3%
Monthly	16.9%	21.2%
<1x/Month	21.8%	44.5%
Never	47.6%	16.1%
Most Frequent Populatons of Use	Stroke – 25.8% Musoculoskeletal Rehab – 15.3% Brain Injury – 14.9%	Stroke – 29.0% Brain Injury – 16.0% Musculoskeletal Rehab – 15.7%
Highest Priority Functional Areas of Use	Balance – 39.3% Exercise/Physical Activity – 19.8% Mobility/Gait – 12.1%	Balance – 66.2% Upper Extremity Function – 12.2% Motor/Cognitive– 4.5%

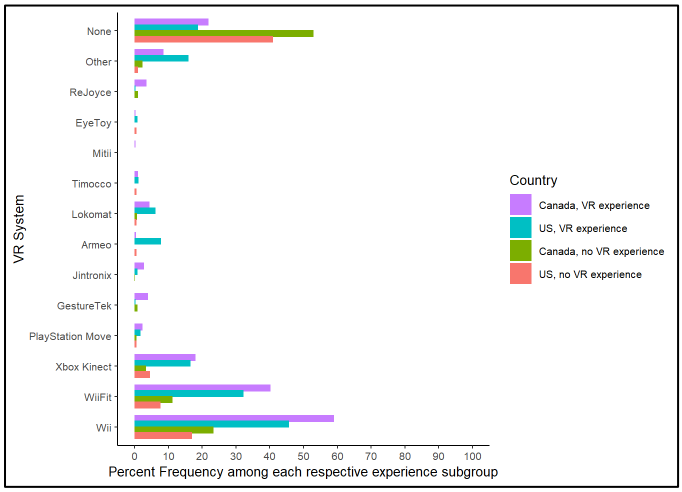


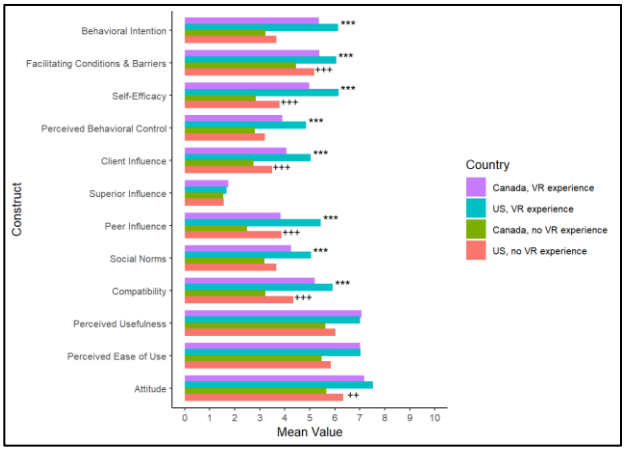
Fig. 1. Frequency of workplace-accessible VR/AVG systems in Canada and the US, for those with and without VR/AVG experience.

B. *Attitudes, barriers, facilitators*

Fig. 2 illustrates ADOPT-VR2 construct means for respondents in each country with and without VR/AVG experience. Higher scores indicate more positive attitudes with respect to that construct. Figs. 3 and 4 illustrate between-country differences in facilitators and barriers to VR/AVG uptake for respondents with and without VR/AVG experience. Higher scores indicate stronger agreement with the presence of each facilitator or barrier. US respondents with VR/AVG experience indicated significantly greater behavioral intention to use VR/AVG, perceived behavioral control, client influence, peer influence, social norms, compatibility and self-efficacy in VR/AVG use as compared to Canadian respondents. US respondents also rated facilitators more positively and barriers less negatively as compared to Canadian respondents. In responses to the free-text entry questions, no facilitators or barriers were described by respondents in the US that differed from those previously identified by Canadian respondents.

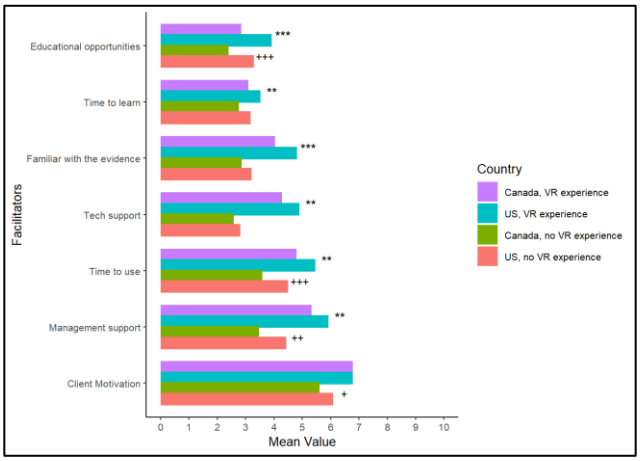
C. Predictors

Table 3 provides the results of linear regressions of each ADOPT-VR2 construct on Behavioral Intention to use VR/AVGs, for respondents with and without VR/AVG experience in each country. All ADOPT-VR2 constructs, with exception of "Superior Influence" and "Perceived Behavioral Control" were found to be significant predictors of behavioral intention to use VR/AVGs across both experience groups in both countries.



*** or $^{+++}$ indicates $p < 0.001$ for each experience level (VR experience***, no VR experience $^{+++}$; ** or $^{++}$ indicates $p < 0.003$

Fig 2. Differences in ADOPT-VR2 means with significance indicators for respondents with and without VR/AVG experience in Canada and the US.

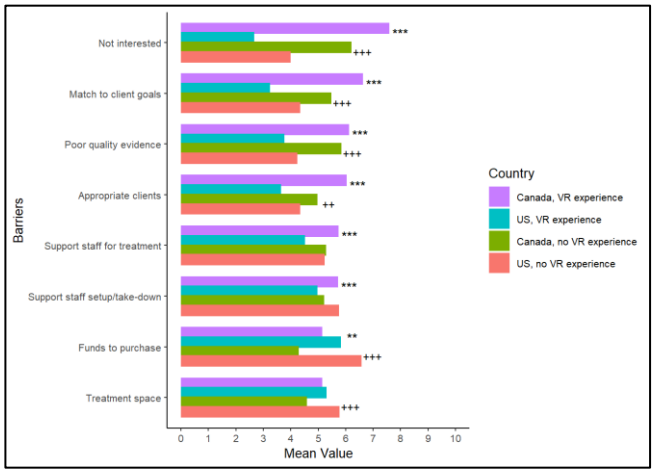


*** or $^{+++}$ indicates $p < 0.001$ for each experience level (VR experience***, no VR experience $^{+++}$; ** or $^{++}$ indicates $p < 0.003$

Fig. 3. Differences in facilitators for VR/AVG uptake with significance indicators for respondents with and without VR/AVG experience in Canada and the US.

D. Learning needs and preferred forms of support

Fig. 5 illustrates differences in respondents' reported confidence in providing VR/AVG interventions for those with and without VR/AVG experience in each country. No significant differences were observed between countries with respect to preferred forms of support for education and KT initiatives. Respondents in both countries ranked the following formats as most preferred: videos, websites, webinars, knowledge syntheses, e-learning, and email.



*** or $^{+++}$ indicates $p < 0.001$ for each experience level (VR experience***, no VR experience $^{+++}$; ** or $^{++}$ indicates $p < 0.003$

Fig. 4. Differences in barriers to VR/AVG uptake with significance indicators for respondents with and without VR/AVG experience in Canada and the US.

TABLE III. ADOPT-VR CONSTRUCTS AS PREDICTORS OF BEHAVIORAL INTENTION TO USE VR/AVGS

ADOPT-VR2 Construct	**Country and experience**			
	Canada No VR R-Squared	***US No VR R-Squared***	***Canada VR R-Squared***	***US VR R-Squared***
Attitudes	0.20**	0.25**	0.23**	0.28**
Perceived Ease of Use	0.15**	0.17**	0.20**	0.17**
Percieved Usefulness	0.16**	0.16**	0.18**	0.25**
Compatibility	0.16**	0.41**	0.26**	0.31**
Social Norms	0.20**	0.19**	0.11**	0.26**
Peer Influence	0.20**	0.02	0.20**	0.33**
Superior Influence	0.08	0.00	0.01	0.01
Client Influence	0.16**	0.15**	0.21**	0.19**
Perceived Behavioral Control	0.02	0.06	0.09**	0.27**
Self-Efficacy	0.17**	0.12**	0.24**	0.22**
Facilitating Conditions and Barriers	0.17**	0.14**	0.33**	0.28**

** $p < 0.001$

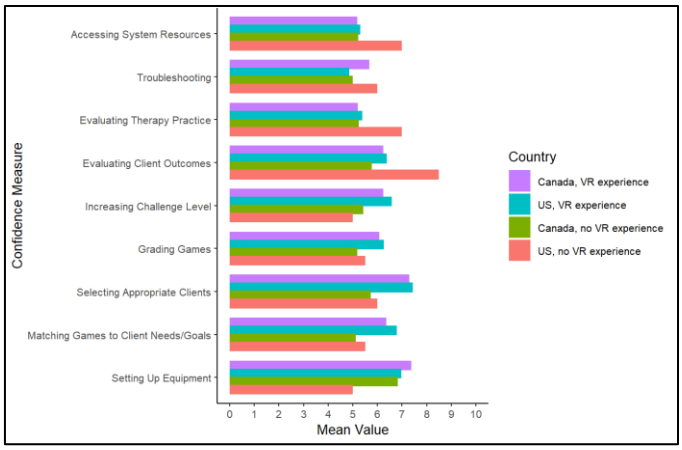


Fig 5. Differences in confidence in aspects of using VR/AVG systems in clinical practice between respondents with and without VR/AVG experience in Canada and the US.

III. Discussion

This study compared the extent, nature and determinants of use, and learning needs related to VR/AVG use in PTs and OTs in Canada and the US. Findings reflected broad similarities with respect to the populations, settings and goals of use in both countries. While more respondents in the US than in Canada reported past and current use of VR/AVGs, the gap between the proportion of clinicians who reported past experience and those who reported current use of VR/AVGs was approximately the same in both countries. Indeed, fewer than one third of respondents in each country were currently using a VR/AVG system in their clinical practice. Clearly, many clinicians are trialing but not continuing to use VR/AVG systems. Potential explanations for this finding can be interpreted from the survey results.

Firstly, clinicians in both countries report predominant use of off-the-shelf, non-customized systems, which is similar to results from a recent survey of physical therapists in Scotland [12]. The prevalent use of non-customized systems (specifically, the Nintendo Wii/WiiFit and to a much lesser extent, the Kinect) in all three countries reflects the substantially lower cost and greater accessibility of these systems in comparison to customized, rehabilitation-specific systems. Respondents in both countries rated 'cost' as one of the most significant barriers to VR/AVG use. However, respondents also strongly agreed with statements that VR/AVG systems did not match their client goals, and that they had clients whose goals were not appropriate for VR/AVG use. One hypothesis is that clinicians face more challenges implementing VR/AVG systems with their more heterogeneous and diverse clinical populations as compared to the standardized applications evaluated in research studies (e.g. financial or incentive supports for strict dosage requirements, implementation by a single evaluator, and tight inclusion criteria). A particular challenge is that of a wider variety of clients with differing secondary impairments or needs, as compared to participants included in clinical trials. KT efforts could focus on ways to assess whether existing evidence can be extended to a wider range of client needs and implementation environments and scenarios.

Country-specific differences in customized system use may relate in part to the location of the system developers, which influences marketing range. For example, Hocoma has more clinical relationships in the US than in Canada, and survey results demonstrated greater use of the Lokomat and Armeo (Hocoma products) in that country. However, Hocoma may likely have identified the greater potential user base in the US, thereby limiting exposure to the Canadian market. Jintronix, a customized system produced by a Canadian company (which is also accessible and FDA-cleared in the US) demonstrated a higher prevalence of use in Canada as compared to the US.

US respondents had more experience using VR/AVGs, and reported more positive ratings of facilitators, less intense barriers, and higher mean confidence in and behavioral intent to use VR/AVGs as compared to clinicians in Canada. One explanation is in the survey results indicating country-specific differences in reported highest priority functional areas of use (Table II). US respondents reported using VR/AVG systems primarily towards 'balance' goals. While this was still the most predominant reported goal in Canada, the prevalence of respondents indicating this goal was less. Many VR/AVG systems have demonstrated evidence of effectiveness towards balance or postural control outcomes in a variety of populations.

More research is needed to confirm other potential features of the US practice context that may be facilitating these more positive results. Indeed, the range of practice settings in which respondents used VR/AVGs was similar in both countries, negating the possibility that certain practice settings more amenable to VR/AVG use than others were represented to a greater extent in the US. Wide variations in available resources and funding models exist between individual states and provinces within each country, and between different health care environments within a state or province. While the survey asked about the influence of managers and peers, it did not explore the broader context of health care funding and policies in each country, province or state.

The most important learning needs and formats for support were similar between countries. This finding supports generalizability of planned KT strategies that target these needs and preferences. Given that most survey respondents indicated positive attitudes towards VR/AVG use, one emphasis of KT materials could be on leveraging identified facilitators within health care environments. For example, positive attitudes can be leveraged as a facilitator to mobilize peer influence, which was a significant facilitator in both countries. Examples include champions or knowledge brokers, mentoring, expert clinicians to facilitate training, and highlighting outcomes achieved by peers using VR/AVG systems. For those without experience, peers and superiors with positive attitudes can be leverage; however, in the US, these were not significant predictors, so alternate approaches may be more successful.

Additional modifiable facilitators include educational support, time for clinicians to learn how to use, and evidence. Survey results can inform the content and format of KT strategies directed towards these facilitators, including materials that summarize and enhance clinical accessibility of the evidence for busy clinicians. Identified facilitators that would require the most financial investment and institutional buy-in are

managerial support and technical support. Survey findings can be useful as evidence when requesting institutional funds to support change in these areas. Client-level KT interventions include identifying and targeting the determinants of client motivation, including therapists' skills and approaches during the therapeutic process.

With respect to barriers, previous work has shown that addressing the environment or context of VR/AVG use is critical to achieve behavior change [7,8,13-17]. A local assessment of the barriers and facilitators at play can be used to develop a tailored approach to facilitate VR/AVG implementation in a given setting.

Given the prevalence of non-customized VR/AVG system use as reported in this survey, a key consideration for the development of subsequent KT materials is whether they should focus solely on these types of systems. This is an important consideration given the planned obsolescence of non-customized systems, such as the Wii and Kinect, in which clinicians have clearly invested their time and energy. It is likely that such equipment will continue to have a long clinic life after the manufacturer ends production, as products that are obsolete in the recreation market are still relevant to the rehabilitation market. Regardless, consistent, overarching principles of interaction with these systems exist and can be identified that translate to other consoles and act as the focus of KT efforts. However, clinicians likely appreciate very specific, actionable information about individual games and consoles. As such, KT developers must resolve the challenge of how to design resources to target both general skills (i.e. VR/AVG competencies and principles that transcend individual system characteristics) and information specific to each console or game. A second issue to consider in this regard is the gap between customized and non-customized systems with respect to their evidence of effectiveness. Systematic reviews have suggested more robust evidence for rehabilitation-specific customized systems [18-20]. However, their use is currently extremely low in comparison to more accessible and lower cost off-the-shelf systems. Reflection is required as to whether it is worth the time, cost and effort to develop KT strategies related to the use of non-customized systems, in an effort to increase their evidence-based use.

A. Limitations

Differences in the sample size between the two countries was a study limitation. The US response rate was unknown, as our online sampling strategy made it impossible to identify the number of people reached. The US recruitment strategy relied more heavily on personal contacts and social media, while the Canadian strategy was more direct and representative (including direct emails to members of professional associations). This difference suggests that the US sampling strategy could be biased towards clinicians with experience and interest in using VR/AVGs. A second limitation was the timing of survey distribution, as the Canadian survey was disseminated 2-3 years earlier than the US survey. One potential impact of this difference is that US respondents had more time to integrate VR/AVG systems into clinical practice than did Canadian respondents, increasing the potential for past experience. If this was the case, we might have expected to see this finding reflected predominantly in systems that were more recently introduced to the market (such as the Microsoft Kinect, or any head mounted display [HMD] VR system), rather than with the Nintendo Wii/WiiFit, which was already long established in Canada at the time of our survey. However, no difference was observed in the use of the Kinect or any HMD system.

B. Next steps for research in this area

Subsequent steps include analyzing the responses to the open-ended survey questions related to participants' thoughts and opinions regarding VR/AVG use, and examining potential differences in treatment setting and type of client between respondents who use customized versus non-customized systems. These results could inform subsequent VR/AVG system development. Indeed, the investment to take a medical technology product to the US market is thought to take 10 years and cost an average of $24 million, as a result of clearing regulatory hurdles [21]. Finally, we will extend the survey to other countries with strong VR/AVG research presence, such as the UK, Israel, Brazil, Portugal, Spain and Italy.

IV. CONCLUSION

Comparing VR/AVG system use, attitudes and learning needs in the US and Canada informs the content and format of educational interventions designed to promote the evidence-based implementation of these technologies in practice. Identified gaps between clinicians who have past experience with VR/AVGs and those who are currently using these systems call for better understanding of how to match specific systems with client and therapist needs. Broad similarities between Canada and the US support the generalizability of educational interventions to target identified learning needs. Overall positive attitudes of therapists endorse an implementation approach focused on leveraging identified facilitators. The focus of KT materials must balance the presentation of more robust evidence for customized VR/AVG systems with the clinical predominance of non-customized AVG use. Subsequent work will extend the survey to better understand differences in uptake in the context of various health care funding and policies, to probe differences between respondents with experience in customized versus non-customized VR/AVG systems, and to gain a more diverse global perspective by administering the survey in other countries with strong VR/AVG research activity. The ultimate goal is to apply knowledge gained from these surveys to inform KT and implementation efforts, creating materials responsive to identified learning needs and reported frequency of use.

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