CAUCE Scholarship & Research Fund: Final Report

Identification of researcher(s) and project

Project title: Pharmacy 5in5 and Social Giving

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Research Team:
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Purpose of the research

The goal of this pilot study was to improve the computer-based educational platform, Pharmacy5in5, by adding a "social giving" feature. The Pharmacy5in5.ca platform trains pharmacy professionals to optimize medication use. It was created by pharmacy professor Dr. Grindrod, with support from colleagues in digital gaming, human factors engineering, and adult education. Since launching in Canada in 2018, over 15,000 pharmacy professionals have registered as users, including over 30% of community-based pharmacists located in Ontario. It has become one of the main continuing professional development offerings at the University of Waterloo School of Pharmacy and its use is being expanded to other healthcare professionals. The aim of this project was to pilot test a social giving feature where users could earn charitable giving rewards for completing quizzes and modules, with "social giving" referring to the use of charitable rewards to incentivize learning. This study's social giving intervention was providing donations of meals to Food Banks Canada.

The original objective of the project was to:

- Evaluate how social giving influences healthcare professional (HCP) engagement with a microlearning platform; and
- Determine the feasibility of managing a social giving feature in a microlearning platform.

An additional objective was:
- To assess feasibility and acceptability of the social giving study and provide an effect size.

Background and motivation for the research study

Computer-based education is increasing in popularity for lifelong learning and professional development for healthcare professionals. This education can be presented in the form of traditional lectures, clinical simulations, games, and online discussions. (Guze, 2015) The variety of features available, flexibility and ease of content updates can make computer-based learning very attractive to health professional learners (Guze, 2015; Reeves et al., 2017), but there are concerns that it can also require more self-discipline to maintain motivation and may lead to lower motivation, overall. (Lawn et al., 2017).

Gamification, or the use of game elements in non-game contexts (Deterding et al., 2011) is increasingly being used to enhance user engagement and motivation in online learning, including that directed at healthcare professionals (Cafazzo et al., 2012; Pereira et al., 2014). Research on the most effective gamification features is still ongoing with different features targeting a user's extrinsic or intrinsic motivation. (McKeown et al., 2016; Toda et al., 2019).

A recent cluster analysis of Pharmacy 5in5 users' engagement indicated that pharmacy students had a higher level of engagement with the platform than practising pharmacists (Grindrod et al., 2020). This has led the Pharmacy 5in5 research team to investigate additional features that may enhance pharmacist users' motivation to prolong their engagement with the platform. Recent literature on pharmacist behaviour change has identified that this group is largely motivated by social rewards or incentives (Hussein et al., 2021).

Methodology

A four-month, two-arm randomized controlled trial (RCT) was conducted using the computer-based education platform Pharmacy 5in5.ca. Participants were recruited via email from the pool of registered users of Pharmacy 5in5 located in the province of Ontario (n=9,500). Participants in the intervention group were given access to a social giving feature, where they earned one meal (for a food bank donation) when completing a quiz and achieving a passing score. Participants in the control group were not given access to this feature. Both groups were given access to the same content modules between April 2021 and August 2021. Both groups had usual access to the Pharmacy 5in5 platform and were asked to use the site as per their normal practice during the study period. Participants in the intervention group received one additional email advising them that they would "earn" one meal for donation every time they successfully completed a quiz (achieving a score of three out of five or better). The RCT was conducted in accordance with the CONSORT-EHEALTH checklist (Eysenbach et al.,

2011) and CONSORT 2010 statement, extension to randomized pilot and feasibility trials. (Eldridge et al., 2010)

Feasibility and acceptability of the social giving incentive feature was assessed using surveys and telephone interviews. Feasibility of the RCT was assessed by participant recruitment and retention. User engagement was assessed by the number of quizzes and modules completed.

Key findings

Feasibility and acceptability of the trial design was assessed by measuring the time needed to reach sample size. This was six days (after sending two reminder emails to the 9,250 users originally invited to participate). All users agreed to be randomized into one of two arms, with 15 participants in each. See Table 1 for demographic data for the control and intervention group participants.

Table 1 Demographics of the control group and intervention group participants

Demographics	Intervention group (n = 15)	Control group (n = 15)
Years of pharmacy practice experience		
Less than 1 year	3	0
1-5 years	3	4
6-10 years	2	4
11-20 years	4	3
More than 20 years	3	4
Gender		
Woman	13	11
Man	2	4
Location of training		
Canada	11	12
In the United States	1	0

Outside North America	3	3
Highest level of education		
Bachelor	9	8
Entry-level PharmD	3	1
Masters	1	1
Postgraduate PharmD	1	2
Pharmacy student		1
Pharmacy technicians	1	2
Primary site of practice		
Community: Independent pharmacy	4	6
Community: chain or franchise	8	3
Hospital in-patient	1	5
Other	2	1

There were no statistically significant differences between the demographic characteristics of the two groups of participants and all who completed the survey reported no contamination, i.e., they did not know any other study participants or discuss their group allocation with a colleague.

Feasibility and acceptability of the social giving feature. Weekly donation reports were sent to participants by researchers throughout the 16-week study duration. At a mid-point survey, most users rated the social giving feature as highly acceptable. In the overall satisfaction survey, most users were highly satisfied with the intervention, with 80% indicating they were extremely or somewhat satisfied with the experience of donating meals as a reward, 90% extremely or satisfied with the amount of one meal per quiz completed and 90% extremely or somewhat satisfied with the weekly donation report.

Most users (60%) reported a preference for monthly rather than weekly reports and 90% of users expressed a preference for having a donation history report available on

their Pharmacy 5in5 user account. All users reported that they received their weekly report consistently and agreeing with the total amount of donations reported being an accurate reflection of the number of quizzes they had successfully completed that week.

A majority of users (60%) reported that a higher donation amount would not provide any additional incentive to complete more quizzes. Participants were asked if any other charitable donations would provide more motivation to them than food banks – responses included women's shelters, organizations that provide clothing and education supplies to those in need.

During the interviews, users provided additional information about their experiences during the study period and made suggestions for changes to make the social giving feature more motivating.

> *"…if my weekly report [is] zero out of 150, that means a lot of other people did them and you didn't, so you got to get going." - Participant 1*

> *"The weekly report was a good reminder when it showed up in my inbox, I was like, 'Oh yeah, I haven't done anything of Pharmacy5in5 quizzes lately'... and having the donations was just like an added reminder to do stuff." - Participant 2*

> *"I think one meal was pretty standard. Because the quizzes are quick, right? I feel like it would be excessive to have more than one meal, especially just because they're so quick to finish…I guess a higher donation amount would be good, but then I would fear that it would not be sustainable for who was providing the money." - Participant 2*

> *"…It [knowing what others have been donating] would have made you feel that what you were doing was important, especially if you felt like other people had been doing it too. I think that's kind of motivating." - Participant 2*

> *"It's more difficult to motivate myself to do quizzes that I have already done even though there is the potential to earn a reward by doing them again." - Participant 3*

Potential impact of the intervention on user engagement

As shown in Table 2, the total number of quizzes completed in full by users in the intervention group was 267, while the total number of quizzes completed in the full by users in the control group was 97. The number of successfully completed quizzes (a score of at least 3 out of 5) was approximately three times higher in the intervention group than in the control group. Overall, 250 meals were donated to Food Banks Canada over the course of the 16-week study period.

Of note, five new quizzes were released during the study period, with these focused on content related to the COVID-19 pandemic and vaccination. Most users in the intervention group completed quizzes whether there was new content or not, while most users in the control group seems more active in the weeks when new content was released. Only two participants in the intervention group did not donate any meals or complete any quizzes throughout the study period, while in the control group only 53.3% of users successfully completed at least one quiz.

Table 2: Users engagement by the study groups

User engagement elements	Control group (n=15)	Intervention group (n=15)	P value*
Number of quizzes completed in full	97	267	0.023
Number of modules attempted	28	81	0.013
Number of modules completed in full	10	34	0.0157
Number of quizzes with a score of at least 3 out of 5	80	250	0.0131

* Independent t-test

Key impacts on continuing health professionals' education and the pharmacy community

This pilot study confirmed the feasibility and acceptability of a "social giving" incentive feature for pharmacists and other pharmacy professionals using an online education platform. Most users in the study reported being highly satisfied with their contribution to food bank donations and the reporting system.

The study also showed that users in the intervention group demonstrated higher levels of engagement with the platform compared to users from the control group. This highlights the potential for including altruistic and other types of incentives as behaviour change techniques for pharmacy professionals. These results are consistent with a recent study that used the Theoretical Domains Framework to identify barriers and potential behaviour change techniques among Canadian pharmacy professionals. (Hussein et al., 2021).

As well, the trial confirmed the feasibility of the study design, as the research team was successful in recruiting, randomizing, and following users over the test period without contamination.

Conclusion

This pilot RCT demonstrated the feasibility of conducting an online study with high fidelity and acceptability by pharmacy professionals. The study also demonstrated users' high satisfaction with a social incentive intervention. Moreover, preliminary estimates of the impact of the social giving feature showed a significant increase in user engagement with a computer-based education platform. Further efforts should be made to increase pharmacy professionals' retention and follow up assessment in a full-scale RCT.

Notes

- Ethics approval was obtained from the University of Waterloo Ethics Committee (ORE #42821). All included participants completed a consent form before being randomly allocated to the intervention or control group.
- A manuscript describing this study has been submitted to BMC Medical Education and is currently under review.

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