Motivating Engagement with a Wellbeing App Using Video Games and Gamification

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ABSTRACT

MindMax is a mobile wellbeing application produced by the Australian Football League Players' Association (AFL Players), with the aim of improving the wellbeing of young Australians. The project engages a strategy of wellbeing science delivered via mobile technology while harnessing the popularity and appeal of both sports and videogames. Though the app itself provides traditional casual gameplay, the integration of the game with other elements of the app also drives engagement with the wellbeing content as well as interactions with other users. This paper reports upon the design of the application and project, as well as providing an initial evaluation of the impact of its use of games and gamification.

Author Keywords

Videogames; video games; gamification; mHealth; wellbeing; engagement

ACM Classification Keywords

K.8.0 Personal Computing: General: Games; J4 Social and Behavioural Sciences: Psychology; H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION

MindMax is a free-to-use mobile health (mHealth) wellbeing app designed and developed by the Australian Football League Players Association (AFLPA), and funded by the Movember foundation, in order to engage young people with wellbeing educational resources. These resources have been based upon the principles of cognitive behavioural therapy, mindfulness, and strengths and values recognition in order to increase users' resilience and psychological wellbeing. The MindMax engagement strategy aims to harness the high interest in videogames and AFL to engage users with this content. In particular, the

great familiarity of the Australian population with videogame play (67% of the population plays [3]) is currently being used to engage current users within the app, and is intended to also engage current and potential users external to the app, such as with live streamed videogame competitions and real-world events in game play venues.

Relatedly, the project makes use of a range of gamification techniques, such as points (in this case 'footies', or Australian footballs) and leaderboards to encourage users to access and return to the wellbeing content. However, it facilitates a more meaningful engagement with these mechanics by personalising the ways in which users engage with the app, such as through: avatar customisation; a social feed in which users can post, comment and like each other's contributions; and space for users to reflect upon how the wellbeing content can be applied within their own lives [17]. Additionally, users are given 'footies' every time they complete a wellbeing module, or engage with the social feed (posting or commenting), that can then be used in the app's collection of casual games (i.e., each 'footie' can be used to take a shot at goal in a football kicking game). This means that games and gamification are utilised at multiple levels: within the overall engagement strategy; to tie together elements of the application; and to directly provide casual gameplay, which comes with its own associated benefits [19].

The development process has also involved the input of potential users during the early design stages. As the project moves forward, it remains responsive by making use of an agile methodology, in which user feedback continues to inform future updates. Updates include both the release of new wellbeing content as well as additional functionality and the refinement of existing functionality. In this way, the project seeks to maintain user interest over time, with the proviso that productive disengagement, in which users' needs are met and the app becomes no longer needful, is also a desirable outcome [22].

This paper describes both the design process and engagement strategy in greater detail, as well as its ongoing evaluation, initial findings, and next steps. Initial user experiences suggest that the casual gameplay is bringing people back to the application, as well as engaging them with other components. The potential for greater delivery of meaningful gamification within further iterations is discussed.

GAMES, GAMIFICATION AND MOTIVATION

Balancing the relationship between intrinsic motivation, or choosing to take part in an activity because it is enjoyable to do so, and extrinsic motivation, or the requirement to be rewarded for taking part in an activity, is at the heart of both games and gamification design processes. mHealth and electronic health (eHealth) applications faced with the challenge of motivating healthy behaviours have borrowed from gamification practices to motivate engagement with content, and behavioural change [13]. Gamification entails the use of video game mechanics or components within non-game settings in order to make the activity more enjoyable and to motivate greater engagement [11]. For example, *Zombies, Run!* is a mobile exergame using narrative elements and events (e.g. missions, zombies chasing you) and to motivate running [7]. In contrast, *Oiva,* another mobile application, uses virtual rewards and progress indicators to motivate engagement with content framed by acceptance and commitment therapy [1]. While gamification has been found to be especially impactful on physical health interventions, mixed findings have been found for cognitive outcomes [13].

Recent research also suggests that the use of elements such as points, levels and leaderboards act as extrinsic motivators, which while potentially increasing the quantity of effort that individuals put into a task, do not impact on the quality [15]. This is supported by research finding that intrinsic motivation is associated with greater quality of performance [5]. Taken together this suggests that both intrinsic and extrinsic motivation need to be considered if authentic driven engagement is a desired outcome.

One solution is concerned with creating 'meaningful gamification', or providing users with the means to internalise the need to perform the actions required of them [17]. Internalisation is a process by which an external regulation is transformed to one that is linked to a sense of self, through the satisfaction of psychological needs [20]. It has been suggested that internalization is made possible by acknowledging that the user and artefact are situated with a larger social sphere and that creating a match between them requires understanding how this context shapes the interaction [10]. As such, a granular investigation of users' experience of MindMax – including investigation of the personal characteristics of these users and how they use the app - is necessary to better understand how to make improvements across the design cycle.

Avoiding a one-size-fits-all approach to design also suggests customizing the gamification experience to diverse motivations. An early exploration of gamification user preferences resulted in a six-sided framework, with correlations to different design elements (e.g. the Socialiser positively correlates with guilds or teams, while the Achiever prefers levels and quests) [24]. As such, the different features MindMax presents may engage differing motivations or even populations. Tracking preferences for different features may retrospectively support this typology or provide further insight into these categories.

Finally, the facilitation of player-generated content has been identified as a way by which users might develop a more meaningful relationship to content [17]. One way this can be achieved is through the user setting the goals or benchmarks that must be reached [9]. However, there is evidence that goal-setting within an online community is more effective when users interact with other goal-setters, through the receiving of feedback, or collaboration with others [4]. It seems likely that positive, including creative, interactions may foster a sense of relatedness between individuals and with a community. Relatedness, or the need to feel connected with others is key to the processes of internalization, and also has a direct relationship to wellbeing [20]. As such, building a feeling of community within and around MindMax may well be pivotal to increasing wellbeing across the targeted population.

DESIGN AND ENGAGEMENT STRATEGIES

Participatory design was utilised in order to create a credible and engaging mHealth intervention. Workshops took place in the Australian capital cities of Melbourne, Brisbane and Sydney between September 5-6, 2016. They captured the thoughts of AFL players and fans; videogame players; and mental health and wellbeing consumers and professionals, including clinicians and academics. General feedback was given regarding the need for a free, lightweight (low bandwidth) app that provided passive data tracking. However, more specific feedback indicated the need to provide rewards for continued engagement, and the challenge of integrating a game into the app. Rather participants believed that gaming could more easily be a reward in and of itself, with access to games or game events used to motivate engagement with the app.

With this in mind the development team decided upon which features would be released initially, with additional functionality and content to be released and evaluated in subsequent stages. User acceptance testing (UAT) was applied to a Beta version of the app, while the post-Launch version (MM.1) incorporated the learnings of the UAT. MM.1 was subject to extensive marketing by the AFLPA, Movember, and partners, resulting in its uptake by 661 members of the public within the first week of the official launch.

MM.1 offers wellbeing modules focused on Fit Minds, Values and Thoughts (held under a tab labelled 'Train'). Fit

Minds proceeds with a survey used to gauge users' current wellbeing and prompt self-reflection. Additionally, it contains a call to action called the MaxFive. This produces a player card in which users nominate to complete five goals that action five ways of improving wellbeing: Connect, Move, Tune In, Learn, and Give (see Figure 1 below). In turn, each users' MaxFive can be shared on to the social feed, under a tab labelled 'Share'. Additional tabs give users the option to customise their avatar ('Me'), and play any available casual games ('Play'). Both the Values (an exploration of users' values and how to implement them) and Thoughts (how to identify 'wonky' thoughts and place them in perspective) modules also contain content that can be shared ('shareables').

The use of playful devices to illustrate key concepts are embedded in each of the modules. For example, the Values module makes use of audio files to demonstrate that 'wonky thoughts' don't hold as much power when spoken in funny voices. This module also makes use of users' game play knowledge and a mini-game to illustrate a concept. The player is first introduced to the metaphor of third-person view in videogame play as providing the player with a more objective position from which they can identify and deal with problems. They are then asked to identify goals they would like to focus on (e.g. go on an adventure with family). The next tab then illustrates these ideas using a mini-game. Users' goals are written on asteroids, which float across the screen. The player is asked to tap an asteroid when they are in colour. Crucially, tapping obstacle asteroids containing unhelpful thoughts (intentionally or accidentally) causes them to increase in size, so players must wait for them to pass to avoid making the unhelpful-thought asteroids expand to fill the whole screen. Further mini-games are intended for modules yet to be released.

The connecting device between the different elements of the app - the modules (Train), the social feed (Share) and the games (Play) is the use of 'footies'. These are points given for completing modules (however many times they wish), or posting or commenting on posts in the social feed, which can then be used for additional lives in the casual game on offer. The first game on offer was Cr***y Bird, in which a small bird needs to navigate a series of obstacles, using tapping on the screen to keep it aloft. Feedback from participants suggests that the game was extremely difficult. The follow-up game, an Australian football-based game based upon paper-toss game mechanics, allows players to flick a footy through goal posts while negotiating changes in wind direction and strength. The beta version of this game has to date, just been released (29 August, 2017), with the final version to be included in the MM.2 update.

The MM.2 update is due to be released on 11 September, 2017, and will address the feedback produced by the Interview and App Usage study, and the Co-Researcher Workshops (described in later sections of this report). As MindMax is the interface for a broader engagement strategy, further iterations will deliver functionality that presents the user with the chance to participate in events and compete for virtual and real-world rewards. For example, further updates (MM.3 and up), are anticipated to integrate the 'footies' into team-based competitions in which players compete to win tickets to AFL matches or the chance to play online with professional videogame players. Additionally, events will be advertised in the app that will occur both at physical locations (e.g. console gaming challenges and attendance by high-profile ambassadors), and online (e.g. streaming live game-play with expert gamers). In turn, while high-profile AFL players have already been enlisted to use and endorse MindMax as Ambassadors, the next stage will engage high profile gamer Ambassadors. It follows that the constant evolution of the app and attendant strategies demands an evaluation that is flexible and responsive.

EVALUATION
A multi-pronged evaluation of the application began in June, 2017. The use of an agile methodology in the design means that the evaluation sits either along the continuum of the project (from June to December 2017), or captures a slice of the design process. For example, user acceptance testing was conducted on the Beta in December, 2016 and March, 2017, prior to the official release on the 21 June, 2017. Upon the official launch of MM.1, two studies began: a longitudinal series of interviews with recruited and organic users (complemented with app usage data), and a naturalistic trial using surveys administered at multiple time-points. These two studies will both continue for the length of the project. Bridging the design stages of MM.1
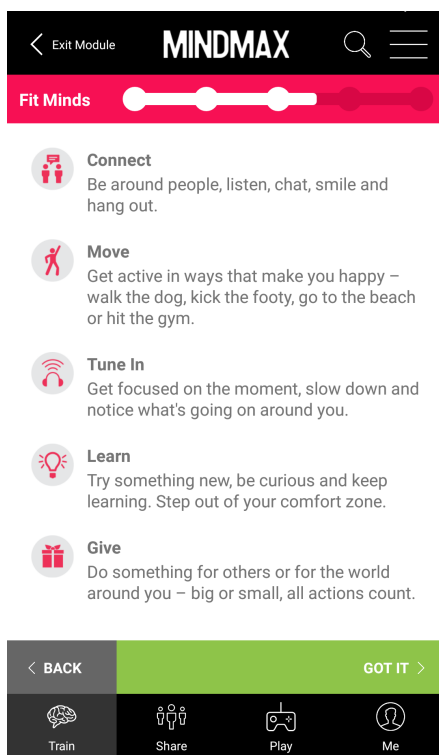

Figure 1 'MaxFive': five ways to wellbeing

and MM.2 only, a cohort of co-researchers was assembled to study how to build community in and around MindMax. At the time of writing only the UAT has been completed and all other studies are ongoing. The following describes these studies in greater detail and presents initial findings.

User Acceptance Testing

During the Beta release a number of quick updates were made to accommodate feedback from the user acceptance testing. Testing with nine participants (aged 19 to 37 years, M = 26.44 years, 5 female), confirmed that the decision to allocate points for posting content was engaging. However, concerns were raised as to the possibility that users may not engage meaningfully with the app or wellbeing content, but instead be focussed upon gaining points. While sharing the app with AFL celebrities was appreciated, concerns were raised as to how users' might protect their own privacy (specifically, via the shareables). These points were shared back iteratively with the management and development teams.

Naturalistic Trial

A naturalistic trial is currently evaluating the impacts of MindMax, using validated wellbeing and usability measures. Participants are asked to engage with the app normally and respond to a survey on a regular basis at five time-points (Day 1, Day 30, Day 60, Day 90, and last day of trial, maximum 180 days). Each person's Day 1 is the first day they start using MindMax. Trial participants are remunerated for their time. The measures include: demographics, interest and involvement in both AFL and video game communities; Flourishing scale [12]; Connor-Davidson Resilience scale [6]; The Warwick-Edinburgh Mental Well-being Scale [23]; adapted General Help-seeking Questionnaire [25]; Basic Need Satisfaction in General - Relatedness subscale [8]; adapted Assessment of Self-Group Overlap [21]; adapted Perceived Cohesion [2]; and the System Usability Scale [18]. At the time of writing, Day 30 has been reached by approximately 18 participants. Data analysis is planned once Day 30 reaches a minimum of one hundred participants.

Interview and App Usage Study

This study focusses on the initial and ongoing user experience of MindMax. Specifically, it asks how MindMax features and content; activities and events; and users' personal interests, lifestyle and motivations, all contribute to the user experience. Additionally, it seeks to better understand if MindMax is influencing users' attitudes towards and subjective appraisal of their wellbeing. By utilising both recruited and organic users it seeks to gain a thorough and ecologically valid assessment of the user experience. Recruited users are asked to try out all the features of the app and to take part in three once-per-week interviews. Organic users are users of the app who are asked to take part in weekly interviews during the course of their application usage.

Interviews took place both face-to-face, as well as via Skype and phone for geographically distant participants.

The interviews covered a range of subjects, from users' definition of wellbeing and discussion of their current wellbeing; their interest in the AFL, games, and other mHealth apps; and their experience of using Mindmax. At the time of writing fifteen participants have been engaged in this study: nine recruited and six organic users, aged 18 to 49 years (M = 34 years), comprised of ten males and five females. Reimbursements were minimised in order to not unduly influence the choice to use MindMax. In parallel, all participants are tracked in terms of their frequency of use, what elements of the app they chose to use, their use of the social feed, and time spent playing the game. Any insights that might impact on the further development of the app were fed back to the project's management team.

Initial interviews with recruited users demonstrated that the game (Cr***y Bird) acted to bring them back to app, when they felt they had exhausted all other options for engagement. For example:

I've played Cr***y Bird … I'm pretty bad at it but I think it's a good mind challenge. I mean, it got me wanting to beat my last score and stuff like that. (P4)

In addition, these participants expressed an appreciation of being able to set personal goals using the MaxFive shareable, however would have appreciated additional functionality that helped them achieve these goals. For example:

I'd probably like to be able to refer back to what I've completed really quickly, so as a goal setting thing I can just go back to the information I've entered really quick and see, ... what I've entered. Keeps you motivated or keeps you on track. (P6)

Interviews with organic users reveal a complex relationship between users' backgrounds, expectation and actual use of the app. Initial findings suggest that while AFL fandom is the primary force motivating initial uptake, continued use is dependent on a range of factors (including whether MindMax met their initial expectations, desire for self-betterment, and level of comfort with social media), combined with current functionality.

Co-researcher Workshops

These workshops make use of the insider knowledge of young people interested in either AFL, videogames, wellbeing or technology. The program was designed to build their competencies as researchers, as well as glean a fresh approach to understanding the app. Specifically, the workshops were aimed at better understanding how to build community both in and around MindMax, and how to study this. Eleven co-researchers aged between 17 to 31 years (M = 20.9 years; ten males and one female), were asked to attend regular weekly workshops as well as participate in online discussion. One participant only took part in the online component as he was physically distant from the workshop site. As with the previously reported study, any

feedback that might be used to improve the app was passed on to the project's management team.

At the time of writing, several suggestions have been made regarding how the app might encourage people to learn about other users, find friends, utilize the 'MaxFive' shareable for cooperative and competitive ends, and take part in community challenges. For example, the app could benefit from additional functionality that allows people to 'buddy up' with others who have similar MaxFive goals, in order to encourage each other to complete them.

One concern expressed in both this and the previously mentioned study is that the presence of shareables on the Share feed are acting to confuse users as to the authenticity of the posts. As such, one of the challenges identified by the co-researchers is how to encourage authentic posting. A field experiment has been proposed in which three posts - each of which attempts to test different social psychological theories - will be added to the Share feed with the aim of gauging which one generates the most interaction and activity in the feed. At the time of writing, this study is underway.

DISCUSSION
The MindMax initiative presents a unique opportunity to both evaluate the impacts of a mobile wellbeing application and shape its course. Moving forward, the naturalistic trial should produce the clearest indicator of the success of the project in terms of shifts in users' wellbeing over time. However, initial findings from the interview study suggest the impact of design decisions on the user experience, which are in turn determining the transition between initial to ongoing use. The match (or mismatch) between users' personal characteristics and the app's current functionality appears to be impacting on users' motivation to continue use, suggesting the worth of examining the data using a model of situated motivational affordance [10], which may be complemented by an exploration of user types [24].

Feedback regarding the integration of posts with the Share feed, and the doubts it casts on the authenticity of the community it seeks to generate, is a key concern given the importance of social integration to users' developing a meaningful relationship to content and the intrinsic motivation to use the app [20]. However, this feedback has been generated from a relatively small pool of users, including one (the co-researchers) who have been encouraged to approach the app with a critical frame of mind. While further investigation is required to confirm this feedback, continuing to improve upon the social features that increase the likelihood of finding or making friends will only benefit MindMax users.

In addition, while the production of the MaxFive shareable was seen as a meaningful way of enacting wellbeing learnings (by generating meaningful engagement through user-created content [9, 17]), an opportunity gap was identified in which the app could more actively promote adherence to goals. Most current usage of gamification in physical health interventions is directed towards improving motivation to engage with the intervention and complete tasks [14]. However, health behaviours are influenced not only by an individual's motivation, but also their ability to complete the behaviour (capability), as well as triggers to perform the behaviour (opportunity) [16]. A possible solution could therefore be approaching future updates from the standpoint of facilitating social accountability and collaboration, as other research suggests [4]. In turn, the future integration of competitive features is anticipated to be well received from users drawn from the AFL and game play communities.

CONCLUSION
This initial evaluation of the MindMax mHealth application provides insight into the challenges and potential of using games and gamification to meaningfully engaging users with wellbeing content delivered via mobile technology. The use of user created goal-setting and embedded casual game play is acting to engage people with the app and wellbeing content. However, initial qualitative findings suggest that greater social integration will create more meaningful engagement. Future updates will act as testing grounds for the learnings of each stage of the evaluation.

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