Journal of Information System and Technology Management
EISSN: 0128-1666
JISTM
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

JOURNAL OF INFORMATION SYSTEM AND TECHNOLOGY MANAGEMENT
(JISTM)
www.jistm.com

GLOBAL ACADEMIC EXCELLENCE

DESIGNING AND DEVELOPING A PERSUASIVE MOBILE APPLICATION FOR ORAL HEALTH PROMOTION: A METHODOLOGY

Siti Mahfuzah Sarif[1*], Siti Izani Idris[2]

[1] School of Multimedia Technology and Communication, Universiti Utara Malaysia
Email: ctmahfuzah@uum.edu.my
[2] Department of Design and Visual Communication, Politeknik Tunku Syed Sirajuddin
Email: sitiizaniidris.poli@1govuc.gov.my
[*] Corresponding Author

Article Info:

Article history:
Received date: 16.10.2022
Revised date: 07.11.2022
Accepted date: 22.12.2022
Published date: 31.12.2022

To cite this document:

Sarif, S. M., & Idris, S. I. (2022). Designing and Developing A Persuasive Mobile Application for Oral Health Promotion: A Methodology. *Journal of Information System and Technology Management, 7* (29), 155-165.

DOI: 10.35631/JISTM.729014

Abstract:

Maintaining excellent oral hygiene could be very challenging, but it can be aided by employing appropriate motivational approaches. Flossing is one of the critical oral hygiene habits. This paper discusses the design and development of mobile application that could motivate user to learn, perform, and maintain optimal oral hygiene. Applying persuasive design in the development of oral health-related mobile applications could promote this good habit. Thus, the primary focus of this paper is to elaborate on the methodology of finding out a set of design principles under persuasive design for developing a mobile application that could engage user in maintaining good oral hygiene in general. The mobile application also aims to motivate user to take care of their oral hygiene through flossing activities. This paper discusses the design solution through a human-centred process; Design Thinking method. There are five phases in Design Thinking; however, this paper focuses on elaborating the first four phases: Empathy, Define, Ideate, and Prototype. 44 respondents were involved in the process of acquiring the requirements for design and development of a persuasive mobile application for promoting oral health. Finally, a high-fidelity prototype of the mobile application was produced and named as the FlossDance App.

Keywords:

Digital Health; Mobile Application; Persuasive Design Principles; Design Thinking

Journal of Information System and Technology Management
EISSN: 0128-1666
JISTM
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Introduction

Poor oral health affects the social psychology by physical appearance, self-concept, and social acceptance of individuals. The significant effect is self-confidence and self-esteem ability to speak, and smile. The social relationship is dependent on physical attractiveness. A changed aesthetic can have a destructive impact on self-esteem level and, ultimately, the quality of life (Kaur et al., 2017). In addressing this problem, parents should monitor their households' oral hygiene and encourage healthy behaviour at the earliest time possible. Parents should be advised that their dental hygiene practices impact their children's oral health and, consequently, their quality of life. Therefore, to provide parents with sufficient guidance on preserving their children's oral health, a more well-based health education application involving all family members is required to adopt consistent behavioural patterns in childhood begins at home. (De Castilho et al., 2013)

According to Malaysia's Ministry of Health, the oral healthcare program started in 1984 to instil oral health awareness to control oral diseases and maintain good oral health among pre-school children. A more comprehensive and systematic, incremental dental care program was introduced to help the children fully understand oral hygiene before leaving school. (Parmar et al., 2016). However, Malaysians still face severe challenges in oral health. It is estimated that 75% of Malaysians are insensitive to the need for oral health and nine out of ten adults faced periodontal disease (Ramirez, 2014). There is evidence that keeping up with the oral health routines will increase the expenses for its medical coverage.

Like brushing, people are recommended to floss their teeth during the night or once in 24 hours is a good option. Flossing can improve the gums' health and avoid suffering from sensitive or bleeding gums (Constance Hillmann, RDH, 2016). Marchesan et al. (2020) has shown in their findings, individuals who live with floss one or two days per week have lower clinical measurements of periodontal disease and fewer caries than non-flossers. Support the behaviour of flossing as an effective oral hygiene habit to prevent the progression of oral disease.

Thus, a proper flossing technique is the first step to maintaining healthy teeth and gums. People should be aware of flossing and ideally make recommendations for techniques of interproximal cleaning based on the oral condition, preference, and capacity of each person. (Azcarate-Velázquez et al., 2017). However, inspiring people to become more motivated in oral hygiene active is a challenge worth taking.

This paper proposes a high-fidelity prototype of a mobile application named FlossDance App. The application was designed for an engaging and effective user experience to help children maintain a good oral hygiene habits. This application is also a tool to motivate them to floss daily and create alternatives to educate good techniques for flossing. This paper is structured as follows; the following topic will discuss the relevant backgrounds for this study, including the importance of daily flossing and the effectiveness of persuasive design in oral health-related mobile applications. Next, the paper discusses the Design Thinking process of tackling the problems. The discussion is focused on the first four main phases, Empathy, Define, Ideate and Prototype. Next, the paper discusses the results of the Design Thinking process, which focuses on the high-fidelity prototype of the proposed mobile application and discuss possible paths of future work.

Journal of Information System and Technology Management
EISSN: 0128-1666
JISTM
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Background

Lifestyle is a general way of life focused on the interplay between living characteristics and health behaviours, including dental health habits and personal characteristics. Itzchakov et al. (2018) specifically addressed that behaviour change is often controlled by factors that control attitude change. In this view, once habits develop, attitude change immediately activates the activation of the response in mind.

A fundamental human attitude change process that affects almost all forms of social interaction is persuasion. Webb and Sheeran (2006) reported that persuasion and other strategies that modified the behavioural intentions of people effectively had no traction in changing their behaviours. Persuasion is one of the essential qualities given to software products such as interactive tools, websites, and mobile apps. Besides, the persuasive quality was listed as the essence of excellent user experience other than usability (product quality), utility (product usefulness), graphic design (personality expression) and functional integrity (credibility of products) (Shafin et al., 2020).

Oral Health-related Mobile Applications

Most existing oral health apps offer people assistance to maintain excellent oral hygiene habits. All these applications have their way of motivating users, and there are pros and cons as well. Several existing apps are being listed in the next section to compare their strengths and weaknesses. A comparative analysis based on persuasive design principles applied in the existing apps is also included in the following sections.

Brush DJ

The Brush DJ app is free with no advert and can be used with any type of toothbrush. It was launched on the Apple App Store and Android market in 2012. NHS Choice Health Apps Library was accepted this app in 2013 to help manage oral hygiene. All apps submitted to the NHS are reviewed to help people make the best choices about their health, care and wellbeing (NHS, 2018). The app aims to motivate the user to brush for two minutes by playing music from the user's device to encourage brushing for an adequate time. The apps also allow users to set reminders to brush, floss, and remind them to see their dentist (Underwood et al., 2015).

Kolibree

Kolibree App was founded in 2015 by a development team from France that work on smart toothbrush technologies - smart toothbrush with built-in artificial intelligence for family use. Kolibree helps to care for oral hygiene daily by providing real-time feedback on brushing habits by recording smart toothbrush movement. A user-friendly app measures improving oral hygiene with duration, frequency and surfaced brushed. Kolibree also has a virtual coach and gamification concept for gain kids interest using apps. (Simon, 2017).

Text2Floss

Text2Floss is an application to send text message reminders to encouraging oral habits by My Dental Team. Users can receive notifications about crucial dental care as reminders and take before a dentist appointment. After replies, the user can track and view oral health care progress. This app provides videos for tips to floss and can access oral health products suggestions under the developer (Hashemian et al., 2015).

Journal of Information System and Technology Management
EISSN: 0128-1666
JISTM
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Persuasive Design in Digital Health

In general, mobile applications never directly affect individuals' actions, but because of their ubiquity, the acceptance of increasingly persuasive roles can be transferred to our daily lives. As Oinas-Kukkonen and Harjumaa (2008) proposed, Persuasive design principles emphasise the phases of persuasive design implementation. Oinas-Kukkonen and Harjumaa (2008) also outline persuasive design as highly interactive, and persuaders adjust the influence approach as the behaviour changes. Four key categories constituted the principles: the primary task, communication, credibility of the system, and social support (Shafin et al., 2020).

Comparative Analysis of Existing Oral Health-related Mobile Applications

As the summary of the related works, Table 1 shows the comparative analysis of three existing applications related to oral health. The applications are compared based on the persuasive design principles embedded in the design of the applications.

Table 1: Comparative Analysis of Oral Health-Related Mobile Applications based on Associated Persuasive Design Principles

No	Design Principles	Brush DJ	Kolibree	Text2Floss	The application of the design principles
1.	Reduction	✓	✓	✓	Easy to input oral health care progress.
2.	Tunnelling	✓	✓	✓	Play 2-minute music to facilitate sufficient length for flossing/brushing.
3.	Tailoring	✓	✓		The brushing analyser hints practical information to improve brushing techniques.
4.	Suggestion			✓	Receives notification to take premedication dental appointment.
5.	Self-monitoring	✓	✓	✓	Allows user to enter next visit to the dentist/dental hygienist.
6.	Surveillance	✓	✓		Adopts a social role act (as an observer) to another user - motivate to pursue goals.
7.	Conditioning			✓	Users can access the provider's dental team contact and schedule an appointment via email.
8.	Cause and effect	✓	✓		Automatically sync all flossing session data: Duration, Frequency and Flossing area.

Methods

This study adopts Design Thinking as a human-centred process to tackle the focused problem. In general, Design Thinking comprises of four phases; i) Empathise - understanding the user needs about oral health, ii) Define - analyse observations and define the problems, iii) Ideate - get alternative ways to solve the problem, iv) Prototype - create the prototype to the best

Journal of Information System and Technology Management
JISTM
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

possible solutions, and v) Test - examine user acceptance of the app. This paper discusses all the stages before the Test stage and aligns them with the adaption of persuasive design principles in the User Experience (UX) and User Interface (UI) design of the proposed mobile application.

Stage 1: Empathise

User's awareness level, knowledge level and attitude towards subject matter could formulate a better understanding of the user context. Thus, a survey was designed and carried out. The questionnaire consists of three sections: (i) demographic (gender and age), (ii) oral health routine/practice, and (iii) quiz on flossing subject. The demographics are summarised as displayed in Table 2.

Table 2: Summary of Demographics (n:44)

Variable	Count	Percentage (%)
Male	27	61.4%
Female	17	38.6%
15 - 20	12	27.3%
21 - 30	30	68.2%
31 - 40	2	4.5%

44 respondents were engaged in this survey in which, majority of them were male (61.4%). The respondents vary in age; however, many (i.e., 68.2%) aged 21 and 30. Most of them are students from higher learning institutions (i.e., using convenient sampling). As shown in Table 2, 84.1% are either college or university students.

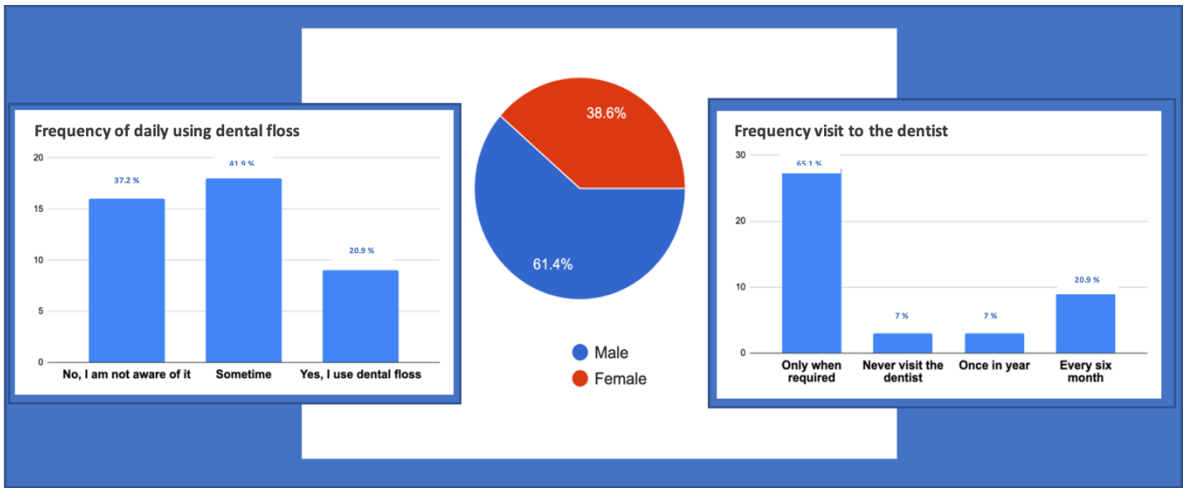

Figure 1: Analysis of Respondents' Oral Health Routines

As shown in Figure 1, 37.2% of the respondents are unaware of the flossing routine, only 20.9% flossed, and 41.9% flossed sometimes. Likewise, records for frequency of visits to the dentist show that 65.1% of respondents only visit the dentist when required, 20.9% of respondents are obedient to visit the dentist as recommended every six months, 7% of the respondents visit the dentist once a year, and 7% of respondents never visit the dentist. These analyses show that most respondents do not have the habit of keeping up with good dental health routines.

Journal of Information System and Technology Management
JISTM
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Stage 2: Define

A simple quiz-like survey was adapted from Lodo Dental (2017) to test the respondents' awareness and knowledge about flossing in the previously mentioned survey. There were four questions for the quiz. The first question assessed the respondent's general awareness; "how many times a day should floss". The second question was designed to assess respondents' understanding of the importance of flossing. The third question assesses the knowledge of the best flossing technique, and the final question asked when the best time is to floss. The quiz result (as shown in Table 3) shows that only 1 out of 4 questions was answered correctly, with the highest score of 60.47%.

Table 3: Summary of Correct Answers in Quiz (n = 44)

No	Question	Correct answers (%)
1	How many times a day should you floss?	60.47%
2	Why is it important to floss?	39.53%
3	What flossing product should you use to clean your smile?	37.21%
4	When is the best time to floss your smile?	48.83%

Stage 3: Ideate

The design solution to the researched problem was done by comparing three existing mobile applications found during this study. Three existing oral health-related mobile applications are examined to elicit their design principles and user interface (UI) features. Similarly, best practices that are relevant to future prototypes are also considered. This study groups all the findings and analysis based on the Starfish Retrospective Model. This method helps the developer to reflect on varying degrees of actions and activities. The gathered data from the Starfish Retrospective technique is as shown in Table 4.

Table 4: The Starfish Retrospective Model of Three Oral Health-Related Mobile Applications (i.e., Brush DJ, Kolibree, and Text2Floss)

KEEP DOING	LESS OF	MORE OF	STOP DOING	START DOING
Brushing teeth for an adequate time	Pairing the app with smart devices (e.g., smart toothbrush)	Teaching proper flossing for developing good dental hygiene habit	Complex UI	Group flossing management system (i.e., keep track of household progress)
Reminder and notification about dental hygiene routine	-	Fun and friendly UI	Too-serious UI and full of jargons (evoke fear of seeing the dentist)	Enjoyable app for younger users (help them start flossing early)

Stage 4: Prototype

Based on the requirements obtained in the previous phase, a high-fidelity prototype was developed with detailed features like the interactive activities, splash screen, buttons, and mock data entry. The mobile application is named as the FlossDance App. The scope of the application is one of the most critical aspects that need to be emphasised to focus the experience

Journal of Information System and Technology Management
JISTM
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

on the user. This study also used the golden rules on interface guidelines; (i) fair use, (ii) flexible use, (iii) simple and intuitive, (iv) visual information, (v) tolerance for error, (vi) low physical and technical effort, and (vii) the community of learner and support (Peters, 2014).

The FlossDance App was developed to improve the behaviour towards flossing activity for households, especially the younger members. To develop the mobile app, the process started by defining the persuasive design principles for the application. Adapting carefully selected persuasive design principles in FlossDance App aims to motivate the user to keep the flossing habit correctly. According to Markus (2016), motivation is what moves people to action. Then the process moves to the design solution stage, where storyboards are prepared and later brought to develop the prototype using an online tool called Just in Mind. This free web-based application provides varieties of modules and components for both Android and Apple Platforms. The UI design of the prototypes is shown and explained in the following section.

Results and Discussion: The High-Fidelity Prototype

The FlossDance App was developed with aim to monitor an evidence-based flossing routine. The main interface shows current and weekly progress (Figure 2). The application aims to motivate users to floss for 1 minute in the morning or before going to bed by three options taken either from one-minute music from playlist (Figure 4) or with a one-minute timer (Figure 5) or the dance video for children (Figure 6). The idea of using music to monitor flossing is based on Clemens and Taylor's work in 1980, where an audiotape combining music and instruction was developed (Underwood et al., 2015). Mobile devices with built-in speakers become more practical listening to music in the bathroom while flossing activity. Playing music or video in the app reminds people not to stop cleaning between teeth to remove a sticky form before the end of the music.

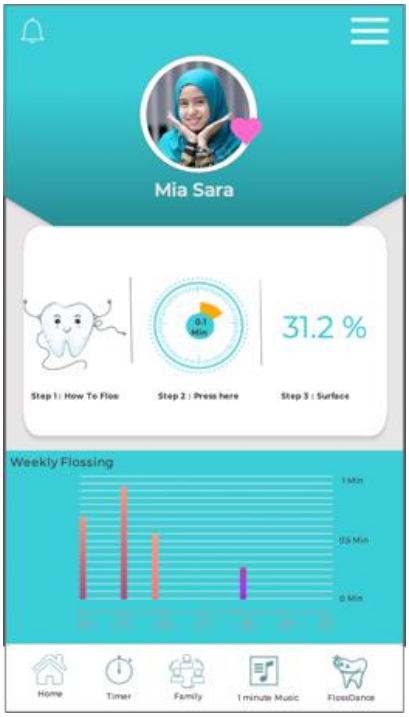

Figure 2: The Main Interface Of The Flossdance App (Showing The Flossing Progress And Other Options)

Journal of Information System and Technology Management
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Figure 3: Screenshot Showing Video Demonstrates How to Floss Teeth Properly

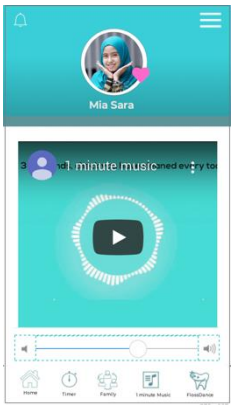

Figure 4: Screenshot Showing 1-Minute Music Option

Figure 5: Screenshot Showing With Timer

Figure 6: Screenshot Showing FlossDance Flossing With 1-Minute Dancing Video

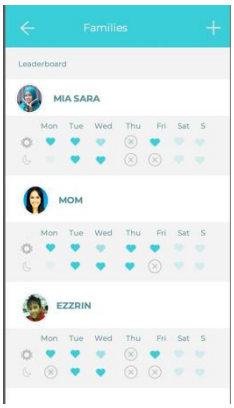

Figure 7: Screenshot To Monitor Family Member In Real-Time

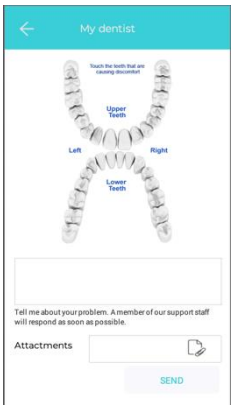

Figure 8: Screenshot Showing User Can Connect Directly With Virtual Specialists

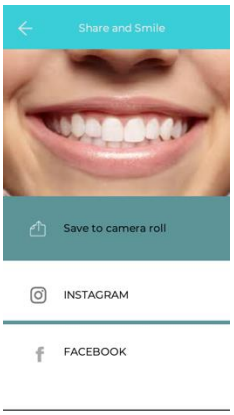

Figure 9: Screenshot For Share And Smile With Social Media Friend

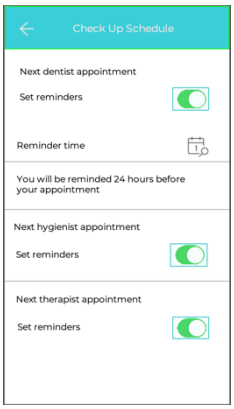

Figure 10: Screenshot To Set A Reminder To A Dentist Appointment

Several persuasive design principles are integrated into the development of the FlossDance App. Based on requirements in Stage 3, the app's concept includes flossing monitoring based on evidence, dialogue support and media to explain how to floss. On top of it all, FlossDance App was designed to be fun and user-friendly to attract the younger users in the household. Table 5 displays all the persuasive design principles crafted into FlossDance App.

Journal of Information System and Technology Management
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

Table 5: Implementation of Persuasive Design Principles in the User Interface Design of FlossDance App

Menu	Design Principles	Features in the app	Implementation of the Design Principles
Flossing Progress (Fig. 2)	Reduction Self-monitoring	Provides interactive progress to track flossing frequency (individual/family members)	Reduces complicated activities. Monitor flossing progress and flossing frequency.
1-minute Floss (Fig. 4) 1-minute Music (Fig. 5)	Tailoring Timing	Guides user to floss interactively and enjoyably.	Provides user with relevant information. Suggests the best way to floss (data-driven).
Video (Fig. 6)	Personalisation	Provides alternative ways to floss for every type of user (e.g., dance video for children)	Provides customised information and recommends that users consider information from previous entries (trustworthy and personalized).
Video how to floss (Fig. 3)	Simulation	Provides a demo on how to floss properly	Includes a virtual world demonstration (video) that can influence users to perform effectively in the real world.
Share and Smile (Fig. 9)	Social Comparison	Shared data (i.e., group progress) is available	Provides greater incentive to perform a target action and how its success correlates with others' performance.
Families' Leaderboard (Fig. 7)	Normative Influence	Since a user can see other family members progress in flossing, it would influence to log their flossing activities.	To improve the output of a target action, the FlossDance App exploits normative influence (group motivation).
My dentist (Fig. 8)	Social role	Includes virtual specialist to support communication between users and dental specialists.	The application can respond to hints of an authoritative personality with a social role (dental specialist).
Families' Leaderboard (Fig. 7)	Praise	Aims at motivating the individual or whole the families at oral hygiene by sending automated text-message when they finish the flossing that day.	Congratulates user every time a user hits a target.

Journal of Information System and Technology Management
EISSN: 0128-1666
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014

1-minute music (Fig. 4) 1-minute timer (Fig. 5)	Reward	Rewards users with joyful sound when they follow the flossing 1-minute menu.	Offering public recognition (individual or group), the app will increase the likelihood that a person or group will adopt a target attitude or behaviour.
Flossing Progress (Fig. 2)	Timing	Monitors and sends a notification to the user as daily reminders.	Mobile platform would be ideal to leverage the timing principle to increase the potential for persuasion.
Share and Smile (Fig. 9)	Linking	Linked to related National Oral Health Association to provide support and communication.	Designed to encourage an intensive, positive relationship between the user and the application.

Conclusions

Health-related mobile applications have seen a spike in recent years. However, this study found that only a handful of design principles were considered to persuasively promote better oral health care. Oral disease affects billions of people worldwide, and mobile phone use is rising, so the market for well-designed and effective oral health-related applications is considerable. This study's primary aim is to develop oral health-related mobile applications that have theoretically grounded content and adhere to sound design principles for better oral health promotion. Thus, three mobile applications have been examined in this study, which leads to crucial opportunities to emerge. As a result, a high-fidelity prototype named FlossDance App was developed. The prototype comprises of flossing technique, prompts, leaderboard monitoring, feedback from the dentist, and social sharing links. The selected persuasive design principles in the FlossDance App could play crucial roles in engaging and motivating the users, especially children, in channelling the change towards adopting flossing as part of a good oral health routine.

References

Azcarate-Velázquez, F., Garrido-Serrano, R., Castillo-Dalí, G., Serrera-Figallo, M. A., Gañán-Calvo, A., & Torres-Lagares, D. (2017). Effectiveness of flossing loops in the control of the gingival health. *Journal of Clinical and Experimental Dentistry*, *9*(6), e756–e761. https://doi.org/10.4317/jced.53858

Constance Hillmann, RDH, B. (2016). *The Benefits of Flossing Your Teeth | Oral-B.* DentalCare Logo.

De Castilho, A. R. F., Mialhe, F. L., De Souza Barbosa, T., & Puppin-Rontani, R. M. (2013). Influence of family environment on children's oral health: A systematic review. *Jornal de Pediatria*, *89*(2), 116–123. https://doi.org/10.1016/j.jped.2013.03.014

Hashemian, T. S., Kritz-Silverstein, D., & Baker, R. (2015). Text2Floss: The feasibility and acceptability of a text messaging intervention to improve oral health behaviour and knowledge. *Journal of Public Health Dentistry*, *75*(1), 34–41. https://doi.org/10.1111/jphd.12068

Journal of Information System and Technology Management
EISSN: 0128-1666
JISTM
Volume 7 Issue 29 (December 2022) PP. 155-165
DOI: 10.35631/JISTM.729014
Itzchakov, G., Uziel, L., & Wood, W. (2018). When attitudes and habits don't correspond: Self-control depletion increases persuasion but not behavior. *Journal of Experimental Social Psychology*, *75*(November 2017), 1–10. https://doi.org/10.1016/j.jesp.2017.10.011

Kaur, P., Singh, S., Mathur, A., Makkar, D. K., Aggarwal, V. P., Batra, M., Sharma, A., & Goyal, N. (2017). Impact of dental disorders and its influence on self-esteem levels among adolescents. *Journal of Clinical and Diagnostic Research*, *11*(4), ZC05–ZC08. https://doi.org/10.7860/JCDR/2017/23362.9515

Lodo Dental (2017). What do you know about Flossing?. Retrieved from https://www.lododental.com/what-do-you-know-about-flossing-find-out-with-this-flossing-quiz/

Marchesan, J. T., Byrd, K. M., Moss, K., Preisser, J. S., Morelli, T., Zandona, A. F., Jiao, Y., & Beck, J. (2020). Flossing Is Associated with Improved Oral Health in Older Adults. *Journal of Dental Research*, *99*(9), 1047–1053. https://doi.org/10.1177/0022034520916151

NHS. (2018). *About the NHS website*. Nhs.Uk. https://www.nhs.uk/apps-library/

Oinas-Kukkonen, H., & Harjumaa, M. (2008). Towards deeper understanding of persuasion in software and information systems. *Proceedings of the 1st International Conference on Advances in Computer-Human Interaction, ACHI 2008*, 200–205. https://doi.org/10.1109/ACHI.2008.31

Parmar, P., Radha, G., Rekha, R., Pallavi, S., & Nagashree, S. (2016). Promoting oral hygiene and health through school. *International Journal of Oral Health Sciences*, *6*(2), 70. https://doi.org/10.4103/2231-6027.199989

Peters, D. (2014). *Interface Design for Learning: Design Strategies for Learning Experiences (Web Design Courses) - Kindle edition by Dorian Peters. Reference Kindle eBooks @ Amazon.com.* New Rider.

Ramirez, E. (2014). Antitrust enforcement in health care - Controlling costs, improving quality. *New England Journal of Medicine*, *371*(24), 2245–2247. https://doi.org/10.1056/NEJMp1408009

Shafin, N. A., Saedudin, R. D. R., & Abdullah, N. H. (2020). Implementation of persuasive design principles in mobile application development: A qualitative study. *Indonesian Journal of Electrical Engineering and Computer Science*, *18*(3), 1464–1473. https://doi.org/10.11591/ijeecs.v18.i3.pp1464-1473

Simon, M. (2017). *Features of the new Ara Smart Toothbrush with artificial intelligence*. Kolibree. https://www.kolibree.com/en/ara/

Underwood, B., Birdsall, J., & Kay, E. (2015). The use of a mobile app to motivate evidence-based oral hygiene behaviour. *British Dental Journal*, *219*(4), E2. https://doi.org/10.1038/sj.bdj.2015.660

Webb, T. L., & Sheeran, P. (2006). Does changing behavioural intentions engender behaviour change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, *132*(2), 249–268. https://doi.org/10.1037/0033-2909.132.2.249