Faseeh: A Serious Game for Arabic Synonym Acquisition

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Abstract

Arabic word synonyms are highly common and valued by Arabic speakers as part of a good writing style. There have been many games that assist Arabic learners, from vocabulary and spelling acquisition to learning grammatical rules and sentence structure. However, no games were found targeting synonym acquisition. This paper presents Faseeh, a serious game that assists Arabic speakers acquire word synonyms to enrich their linguistic and expressive skills. The game employs different gamification techniques; these techniques were implemented to improve user motivation and enhance learning experience. Faseeh statistics and evaluation showed that it has delivered an educational content in a novel engaging manner.

Keywords: Synonym, Arabic Language, Serious Games, Gamification, Language Games, NLP

1   Introduction

Arabic is a Semitic language spoken by nearly 500 million people around the world and one of the official UN languages. Like any language, Arabic has its grammar, spelling, and pronunciation; yet it has its own characteristics which made it distinctive. Arabic is read and written from right to left (except numbers); its alphabet consists of 29 spoken letters, and 36 written characters. Also, Arabic is a morphologically rich language. Most Arabic words are derived from a 3-letter root that are highly generative (Diab, 2004). In addition, words in Arabic might change meaning depending on the context. Synonyms are also commonly used in Arabic, since variety in expression is valued by Arabic speakers as part of skillful writing style (Xu et al., 2002).

Some mobile tools and games have been developed for learning Arabic. These games can be referred to as serious games. A serious game defines those that positively impact users' skills. It is not limited to learning and computer games, but extends to those used for medical treatments and marketing tools (Toma et al., 2017). However, this paper focuses on a mobile game called "Faseeh فصيح" for acquiring Arabic synonyms.

Arabic learning games studied in the literature include LingoSnacks (Erradi et al., 2013), Easy Arabic (Aljunid et al.,2014), and U-Arabic (Alobaydi et al., 2016). Nevertheless, these games focused on teaching spelling, vocabulary or grammatical rules. No application has been found to teach the vast synonyms for Arabic words.

Faseeh game has the potential to assist Arabic native speakers and learners by:
- Encouraging independent learning of Arabic synonyms,
- Providing learners with an engaging game that enriches their linguistic skills, and
- Offering learning activities that allow learners to benefit from their idle times.

The rest of the paper is organized as follows: Section 2 discusses serious games.   Section 3 describes Faseeh game design. Section 4 presents Faseeh statistics. Finally, the paper concludes with future directions.

2   Serious Games

Serious games have emerged due to widespread use of the internet and games, and the need to provide engaging training and educational content. Such transition in delivering education and training includes the use of metaphors of games, or 'gamification' of learning (de Freitas and Liarokapis, 2011). Gamification can be defined as using gaming techniques in non-game contexts as to improve engagement and impact behavior or attitude towards learning (Landers, 2014).

Gamification mechanisms include: progression, investment, and cascading information theory. Progression is allowing the user to reach success incrementally. Investment is allowing the user to feel pride of his/her work. Cascading information theory is by continuously unlocking information (Knewton, 2012).

Many of these mechanisms have been employed in Faseeh. Progression is applied by unlocking levels and gaining points. Investment is applied by displaying a leaderboard that gives public recognition to top users in each game mode. Cascading information theory can be applied by obliging the user to tackle problems in a limited time frame. This is implemented in Faseeh through the time limits that are imposed on each level.

3   Faseeh Design

Faseeh is a serious game that targets Arabic native speakers as well as Arabic learners to enhance and enrich their vocabulary. Basically, the game displays a word/phrase and its corresponding synonyms, from which the user should choose one or more of them. These synonyms were taken from two classical books for Arabic synonyms, namely: Fiqh Allughah/فقه اللغة by Althaalibi and Alalfaz Alkitabiyah/الألفاظ الكتابية, by Alhamazani.

The game database consists of 96 word/phrase each of which has three correct synonyms (in total 288 word/phrase). A set of words/phrases along with their synonyms are grouped into 24 levels based on the books' recommendations. Also, the game requires registration in order to record the user progress.

3.1 Game Options

Faseeh offers three game options: (1) main game, (2) challenge Faseeh and (3) network challenge, as shown in figure 1.

Figure 1: The game main page with the following buttons: (1) Main Game (2) Challenge Faseeh (3) Network Challenge (4) About the app (5) More apps by iWAN (6) Share the app (7) Rate in the store (8) Extra options (leaderboard – settings – about Faseeh) and (9) Log out.

3.1.1 Main Game

The main game option, as shown in figure 2, contains 24 levels, each level has four questions and lasts for 60 seconds. Each question displays a word/phrase, and the user is prompted to choose three synonyms from six presented choices. In this mode, the user has three helping methods (aka helpers) which are: ask a friend, get extra time or omit a choice. If the user used one of the help methods his/her collected points will be deduced.

3.1.2 Challenge Faseeh

The second option (figure 3) is a novel contribution to language learning games. It allows the user to play against a virtual character named Faseeh. Faseeh level will be assigned randomly at the beginning of the option. The level will determine the questions that this character can answer correctly, and it will answer the rest randomly. Each question displays a word/phrase and four choices. Only one of the choices is correct, so whoever chooses the correct answer before time ends gains the point.
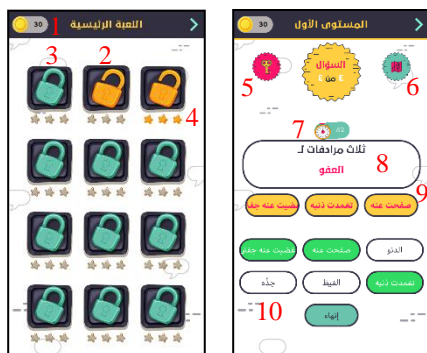

Figure 2: Main Game mode (left): (1) collected points (2) unlocked level (3) locked level (4) stars earned in the level; (right) (5) helpers (6) instructions (6) timer (8) question (9) correct answers (10) user answers.

Figure 3: Challenge Faseeh option (left) (1) player's name and level (2) Faseeh character and the randomly assigned level; (right) (3) Faseeh character collected points (4) player's collected points (5) timer (6) question (7) choices.

3.1.3 Network Challenge

The last option, shown in figure 4, allows the user to play with remote users currently logged into the game. The game displays five questions. Every question shows a word/phrase with four choices, only one of which is correct. The player that answers correctly, within the time limit, gains points. The winner is the player who gains more points.

Figure 4: Network Challenge option (left) (1) player 1 name and level (2) player 2 name and level; (right) (3) player 1 collected points (4) player 2 collected points (5) timer (6) question (7) choices.

3.2 Leaderboard

Faseeh has a leaderboard that displays top users of each game option, as shown in figure 5. There is also a specific board for the player to display his/her achievements separately.

Figure 5: (Left) Game leaderboard, (Right) specific user board.

4   Faseeh Statistics

Faseeh game has gained popularity among people in Saudi Arabia after winning the grand prize of ALECSO (Arab League Educational cultural and Scientific Organization) for mobile applications development[1] in November 2017. The number of downloads exceeded 10K (since November 2017) in both Google play and Apple Store. It also got a rating of 4.8 out of 5 in Google Play and 4.9 out of 5 in Apple Store. The feedback people provided in the comments' section in the app stores were all positive and encouraging.

5   Faseeh Evaluation

Faseeh user evaluation has been conducted to measure players' satisfaction regarding the game. We developed an evaluation questionnaire based on (Göbel et al., 2013) serious games evaluation approach where they identified two main categories for the questionnaire: *user experience and game design*. The user experience has seven subcategories derived from it; we chose six subcategories that were suitable for Faseeh game. The selected categories were: *Positive Emotion, Negative Emotion, Motivation, Immersion, Flow and Arousal*. In addition, we added the challenge subcategory because it was an important aspect of the game. As for the game design, it has ten subcategories; we chose six of them, namely: *Effectance, Curiosity, Personalization, Interface, Feedback and Social Needs*.

Our final questionnaire contained 14 statements (see Table 1), one statement for each subcategory except for the game interface category which had two statements to measure the quality of the interface design and its colors. In addition, we used Likert scale to evaluate each statement. The scale ranged from 1 to 10; where 1 means Totally Disagree and 10 means Totally Agree. Moreover, the questionnaire contained some open-ended questions to elicit users' suggestions for improving the next release of Faseeh.

Table 1: Faseeh Evaluation Questionnaire

No	Cat.	Sub-Category	Question
1	User Experience	Positive Emotions	I have fun when playing Faseeh.
2		Negative Emotions	I didn't feel bored when playing Faseeh.
3		Motivation	I feel excited when playing Faseeh.
4		Immersion	I felt engaged while playing Faseeh.
5		Flow	The transition was smooth between the different levels of Faseeh.
6		Arousal	I feel excited when I win and move forward in Faseeh.
7		Challenge	I feel challenged while thinking about solutions for each level in Faseeh.
8	Game Design	Effectance	Faseeh contributed in improving my Arabic vocabulary.
9		Curiosity	I felt curious enough to complete the levels of Faseeh and learn new vocabulary.
10		Personalization	I can enter a defined name and a character that represents me when I start Faseeh.
11		Interface Design	I find the design of Faseeh interface and its icons beautiful and attractive.
12		Interface Colors	I think that the colors of Faseeh interface are comfortable.
13		Feedback	Faseeh provides me with feedback regarding my choices, whether right or wrong.
14		Social Needs	I enjoy playing with others through "the challenge network".

We received responses from 30 players (ages between 10 and 50 years old). The calculated responses' mean and Standard Deviation (S.D.) are reported in Table 2.

Table 2: Questionnaire Results

Category	Mean	S.D.
Positive Emotions	8.07	2.18
Negative Emotions	7.00	2.39
Motivation	7.53	2.19
Immersion	7.67	2.10
Flow	8.53	2.06
Arousal	8.37	2.17
Challenge	8.33	2.32
Effectance	8.13	2.03
Curiosity	7.53	2.81
Personalization	7.6	3.22
Interface Design	8.53	2.06
Interface Colors	8.57	2.01
Feedback	8.53	2.24
Social Needs	6.63	3.18

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[1] http://award.alecsoapps.com/

The overall evaluation of the user experience was satisfactory; the average score for all subcategories was between 6.63 (Min) and 8.57 (Max), which is considered very good. The emotions subcategory answers (mean 8.07 S.D. 2.18) showed that most of the players enjoyed playing the game. On the other hand, the negative emotion subcategory which measured how often the players were bored while playing Faseeh showed that most players did not feel bored while interacting with Faseeh (mean 7.00 S.D. 2.39). As for the motivation and immersion subcategories, most of the players were motivated and engaged while playing Faseeh. The mean for the motivation and immersion was 7.53 (S.D. 2.19) and 7.67 (S.D. 2.10) respectively. Moreover, the mean of the flow subcategory was 8.53 (S.D. 2.06), which indicates that the transition between the different levels in Faseeh was smooth. Similarly, the arousal subcategory had a mean of 8.37 (S.D. 2.17), which is considered high. Most of the players felt excited after winning in the game and were motivated to proceed to the next level. Finally, the mean of the challenge subcategory was 8.33 (S.D. 2.32), which ensures that the game was challenging. However, the challenge level was not the same for all players based on their age. This might be attributed to the different linguistic backgrounds of the players.

As for the game design category, the first subcategory measured the Effectance of Faseeh. Specifically, how effective was it in enhancing the Arabic vocabulary of the player. This subcategory mean was 8.13 (S.D. 2.03), which showed that it affected the players' vocabulary positively. On the other hand, the curiosity subcategory mean was 7.53 (S.D. 2.81) which might indicate that some players were interested to move to next levels. As for the personalization subcategory, which measured the players' satisfaction regarding the personalization option, its mean was 7.6 with the highest S.D. equal to 3.22, this indicates that some players were somehow satisfied with the personalization options. Yet, others wanted to have more options and characters based on their answers in the open-ended questions (this will be reported later). For the interface design subcategory, we have two statements regarding their satisfaction about the interface design (mean 8.53), and colors (mean 8.57). This category gained the highest means, which showed that most players liked Faseeh's interface. Finally, the social needs subcategory represented the players' opinions regarding "the network challenge". It gained a mean of 6.63 (S.D. 3.18), which is considered the lowest mean in the questionnaire and indicates that some players were not satisfied with the network challenge. However, the high S.D. indicates that there was significant diversity between players' opinions, and we believe that it could be attributed to the availability of other players when playing the "network challenge" mode; therefore, they did not have the chance to try it.

At the end of the questionnaire, there were three open-ended questions that explored most of the features that were liked or disliked by the players. The answers indicated that, most players liked the game idea and its aim and they thought that there was a real need for it in the Arab world. In addition, they liked the quality, design and colors of Faseeh's interface. Moreover, they liked the different playing options that Faseeh has especially the network challenge. Most of the users said that playing Faseeh enhanced their Arabic vocabulary; however, there is still a need to add more levels and new vocabulary. In addition, there was a need to add different difficulty levels based on the players' background knowledge.

As for the future improvement of Faseeh, some players suggested improving the levels of Faseeh so that they should start with easy levels then increase the difficulty level gradually. Also, they suggested changing the interface color for each level to prevent the feeling of boredom. The number of the suggestions regarding network challenge indicated that the players liked the social aspect of the game and they wanted more chances to enjoy it. Finally, there was a suggestion regarding the need to add more modern Arabic vocabulary that can be used nowadays because the used vocabulary in the game was classical Arabic.

6 Conclusion

Faseeh is a serious game that aims to assist Arabic speaker in synonym acquisition. It has incorporated many gamification mechanisms to enhance learning experience. The game is available for download in both Apple Store and Google play by following this link: https://land.ly/faseeh.

7 Acknowledgements

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