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Research Article

Can We Enhance Respectful Behaviors toward Parents with Gamification? An Observational Study of Gamification Elements and Child Attitudes toward Parents

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The use of gamification has gained important attention when it comes to developing desired behaviors in children. However, few studies have used this approach to increase respectful behaviors toward parents in Saudi Arabia. The aim of this study was to propose a gamified application by investigating the game element preferences of children and the children's practices toward parents, and to use the interactive gamification app to enhance respectful behaviors toward parents in children aged 5 to 7 in Saudi Arabia. An interactive gamification app was conceived in order to encourage respectful behaviors in children. Parents observed their children and assessed them with a survey containing questions about respectful behaviors and application elements preferred by children. The questions had an internal consistency reliability above 0.85. There was a difference in gamification elements based on demographics, but no difference in respectful behaviors toward parents. Three gamification elements emerged as important contributors of respectful behaviors toward parents in children: points, rewards, and interaction with others. However, the time the child spent using a smart device was negatively related to respectful behaviors toward parents. A gamified application with two interfaces can be used to enhance respectful behaviors toward parents. Programs that focus on enhancing desired behavior in children aged 5 to 7 should use gamification approaches and direct particular attention to the three aforementioned elements. Moreover, parents should control the time their children spend using smart devices.

1. Introduction

In the Middle East, respect and reverence for older people are of great importance within the family, and it is the most pointed-out value in the Asian culture [1]. It is expected for children to display respectful behaviors toward elders and parents in particular in order to make the family proud [2]. These prosocial behaviors in the parent-child interactions are also encouraged all over the world [3, 4]. So how can respectful behaviors in children be encouraged in this era of digitalization? Children love games, and gamification has become an efficient way of developing desired behavior in children [5]. Among these desired behaviors, respectful behaviors toward parents are among the most important. In fact, raising children who show respect to parents, elderly, and the community in general is the dream of every parent. Therefore, this study is aimed at presenting a proposed conception of the components of an interactive gamified application intending to enhance respectful behaviors toward parents in children aged 5–7 in Saudi Arabia.

There is no consensus on a single and widely accepted definition of gamification. Hamari et al. defined gamification as the use of game design elements in nongame contexts. Gamification has also been defined as a process of enhancing services with motivational affordances for game experiences in order to support users overall value creation [6, 7]. In

general, the term is used to describe those features of an interactive system that aim to motivate and engage end users through the use of game elements and mechanics [8].

Gamification has received empirical support when it comes to developing desired behavior in children. Ahn et al. [9] investigated the effect of points-based reward elements on physical activity in children aged 9 to 13 years and reported that these elements improved engagement in physical activity. A systematic review of studies that investigated the effectiveness of gamification elements on eating behavior in children found that gamification elements were effective in promoting healthy eating and vegetables and fruits intake [10]. Another systematic review of the literature concluded that gamification elements can have a positive influence on well-being and healthy behavior [11]. In their systematic review, Lewis et al. [12] also found that gamification elements such as points, badges, medals, and feedback were effective in promoting desired behavior in children.

Gamification has attracted a lot of attention in recent years from academia and industry. Several frameworks have been proposed to develop and systematize gamified applications in different areas and obtain the desired impact from these applications. Charles [13] proposed the game-oriented learning framework (GOLF). The GOLF framework consists of six core concepts and elements that must be considered to encourage participation. Participation is easier and reinforced when the experience is enjoyable (the fun concept) and has social support from others (the social concept). Participation can also be encouraged when the individual has a visible role in the learning experience (the identity concept). Participation can be built on the motivation of competition and enhanced by social pressure (the challenge concept). The probability of participation is increased if there are clear goals and objectives and acceptable constraints (the structure concept). Finally, making achievements explicit reinforces participation (the feedback concept). Marczewski [14] proposed a simple framework called GAME. The framework comprises a sequence of eight steps (questions) that the system designer must take into account to develop a gamified system: (1) what is being gamified? (2) Why is it being gamified? (3) Who are the users? (4) How is it being gamified? (5) Are analytics set up? (6) Was it tested with users? (7) Was feedback acted on? (8) Was a solution released? The development process is iterative, with steps six and seven being in a loop. Steps five to eight are also repeated in a loop.

AlMarshedi et al. [15] proposed a framework for increasing the sustainability of gamification impact (SGI). As its name implies, this approach aims to increase the sustainability of the desired impact of gamified applications. It is based on three main components: flow dimensions theory by Csikszentmihalyi [16], Pink [17] elements to drive motivation, and self-determination theory (SDT) by Deci and Ryan [18]. Furthermore, SGI is focused on user-centered design (UCD). This framework contains five main elements: flow, relatedness, purpose, autonomy, and mastery in the design of gamified applications. These elements are integrated in order to create the best experience for the user in different scenarios (creating long-term engagement and having a sustainable effect). Simões et al. [19] presented a gamification framework called game elements and game techniques (GET7). It has been applied in social learning environments and has led to effective and systematic gamified systems.

2. The Present Study

This study included three phases. The first phase started with a literature search for frameworks that used game elements and technology for children's learning. Using these frameworks from previous studies, an interactive application intending to enhance respectful behaviors toward parents among children 5–7 years of age was conceived. During the design of the application's components and activities, researchers used the gamification concept and general recommendations for methodological frameworks from previous studies. We then designed the matrix that included knowledge related to respectful behaviors toward parents appropriate for the target age group of children. We also distributed a questionnaire for parents of children in this age group to identify what they considered respectful behaviors in children and their preferences in the elements of gamification in smart device applications. Meetings were then held with specialists in childhood development to verify the accuracy of the procedures and the validity of the scientific content of the proposed matrix.

The second phase involved the development of the application with the following steps: writing the technical specifications for the applications (smart device application), selecting the learning content to be included in the applications, adapting the content to match the digital design, and programming technology products.

The final application offers two interfaces: one for the child and another for the parents. The gamification methods were based on the following: stars, feedback, time, imaginary characters (avatars), rewards, tasks, countdown, unprecedented rewards, and a progression map. Figure 1 is an example of the interfaces for the child; the full application interfaces and description can be found in Appendix A and Figures 2, 3, 4, and 5.

In the third phase, we investigated how to use this interactive electronic application in order to enhance respectful behaviors toward parents based on the results of the parental questionnaire. This was an observational study conducted with 334 participants with at least one child aged 5–7 years who had played the gamified application to investigate the gamification elements, respectful behaviors toward parents, and the impact of different game elements on such respectful behaviors.

The objectives of the present study were as follows:

(1) Investigating children's practices regarding respectful behaviors toward parents in Jeddah, Saudi Arabia, from the point of view of parents

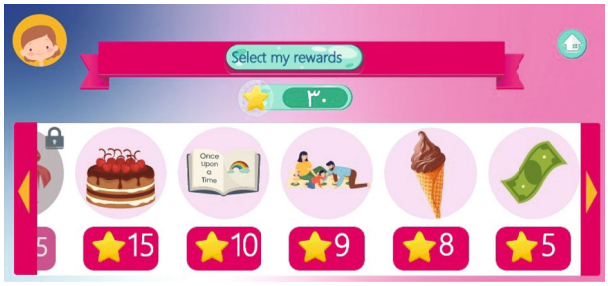

Figure 1: The rewards page where children collect stars that guide them to select the appropriate gift and send the selection to the parents.

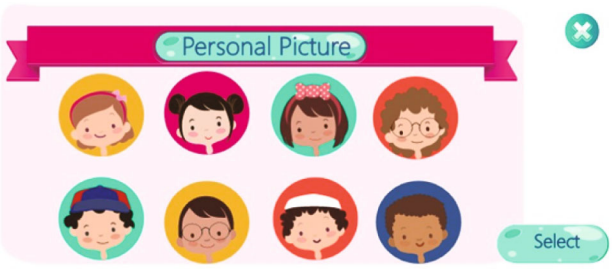

Figure 2: Characters that the child chooses as a personal picture.

Figure 3: The wheel game which urges children to make positive initiatives in which they express their affection toward parents.

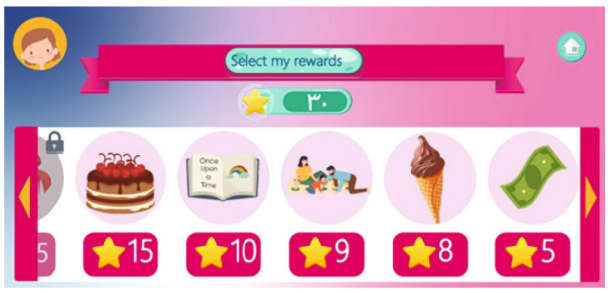

Figure 4: Rewards selection page for the child.

(2) Investigating the preferences of gamification elements for children in Jeddah from the point of view of parents

(3) Presenting a proposed concept for an interactive application that aims to develop respectful behaviors toward parents with elements of gamification preferred by children

Figure 5: A to-do list that the parent organizes in advance into home, health, and behavioral tasks.

To reach these objectives, the study tested the following hypotheses:

H1: there are statistically significant differences in respectful behaviors toward parents based on the gender of the child, number of family members, and income

H2: there are statistically significant differences in the preferences of gamification elements based on the gender of the child, type of applications that the child uses on smart devices, activities practiced by the child through the smart device, and the average daily hours the child spends such devices

H3: there are statistically significant differences in the preferences of gamification elements based on the extent of knowledge of the child's favorite applications by the respondents and based on the child's discussion of their favorite applications with the respondent

H4: gamification elements will be related to respectful behaviors toward parents in children aged 5–7 years

3. Methods

3.1. Data and Participants. A mixed-method approach was used. Expert interviews were conducted for two purposes: initially, to create and validate the matrix of values and activities that reflect the most important elements of respectful behaviors toward parents, and secondly, to clarify the components upon which interactive application activities should be built to encourage this respect. A questionnaire of parents ($N = 334$) was used to evaluate the children's behavior toward their parents. The questionnaire was also used to determine each child's preferences toward the characteristics of some game applications in smart devices. Permission to conduct this research was obtained from King Abdulaziz University. Parents and other respondents gave written signed consent.

3.2. Measures. The questionnaire consisted of multiple-choice questions and Likert-scale questions. The multiple-choice questions, which had four choices (Yes, to some extent, No, and I do not know), were included to gather demographic and other information related to smart device use from participants. The target population in this study was parents or family members of children ranging between 5 and 7 years. The Likert-scale questions were divided into two parts: child behaviors toward parents and the child's

preferences for characteristics of game apps in smart devices. The questions of child behaviors toward parents can be found in Appendix B. For face validity, the questionnaire was evaluated by a group of experts in statistics and psychology, academics, and child specialists. For internal consistency, the Cronbach's alpha was 0.86 for respectful behaviors toward parents and 0.877.

3.3. Statistical Analysis. All statistical analyses were conducted in RStudio [20]. Internal consistency of the questionnaire was assessed using Cronbach's alpha. Descriptive statistics for the sample characteristics and ANOVA tests were analyzed in the first part. In the second part, multiple regression was run to investigate the contribution of gamification elements in respectful behaviors toward parents.

3.4. Results. The characteristics of the sample are summarized in Table 1. Most of the respondents were mothers (86.8%), only 3% were fathers, and 10.2% were other than mothers or fathers. Around 52.7% of their children were boys, and 47.3% were girls. Most of the respondents were city residents (93.1%), and only 6.9% were village residents. Most of them were married (91.9%), 2.7% were widowed, and 5.4% were divorced. About 67.6% had between 5 and 6 family members. Around 13.8% had less than 3,000 riyals in income, 22.5% had income from 3,000 to 7,000 riyals, 25.1% had income from 7,000 to 10,000 riyals, and 38.6% had income above 10,000 riyals. About 20.4% of their children spent on average one hour a day using a smart device, 24.6% spent 2 hours on average, 20% spent 3 hours on average, 13.5% spent 4 hours, 10.5% spent 5 hours and 10% spent 6 hours on average using a smart device. Around 21.5% used a smart device to watch cartoons for entertainment, 12.9% used a smart device to watch educational cartoons, used a smart device to play video games, 3.3% used a smart device to watch both entertainment and educational cartoon videos, 16.1% used a smart device to play video games and watch entertainment cartoons, 9.3% used a smart device to watch educational videos and play video games, and 19.2% used a smart device to watch both entertainment and educational videos and play video games. Around 47.9% of the respondents had an extensive knowledge of the favorite apps used by their children, 35.9% had a medium knowledge, 13.5% had little knowledge, and only 2.7% had no knowledge. Around 53.6% of them stated that their children frequently discussed their favorite apps with them, 36.8 reported such discussions at a limited level, and 9.6% did not discuss apps with their children at all.

The results indicate that more than half of the parents needed to be more acquainted with the nature of the apps used by their children. Moreover, the results showed that children needed to be socialized with the concept of respect and kindness, helping in household chores, using polite words and apologizing to parents, and having the ability to identify what pleases and upsets parents.

Table 2 presents the descriptive statistics for the study variables. The mean score for respectful behaviors toward parents was 50.3 (SD = 7.25, range = 0 – 63), the mean score for preference for apps with avatars was 2.22 (SD = 1.06, range = 0 – 3), for points it was 2.22 (SD = 0.97, range = 0 – 3), for coins 2.26 (SD = 0.94, range = 0 – 3), stars 2.34 (SD = 0.91, range = 0 – 3), levels of difficulty 2.11 (SD = 1.01, range = 0 – 3), leader boards 1.93 (SD = 1.08, range = 0 – 3), rewards 2.42 (SD = 0.90, range = 0 – 3), schedule and countdown 1.58 (SD = 0.98, range =0–3), unexpected rewards 2.20 (SD = 1.07, range = 0 – 3), interaction with others 1.96 (SD = 1.07, range = 0 – 3), progress roadmap 2.34 (SD = 0.912, range = 0 – 3), and feedback 2.39 (SD = 1.96, range = 0 – 3).

To test hypotheses 1, 2, and 3, a set of ANOVA tests were analyzed. The results are displayed in Table 3 for respectful behaviors toward parents and in Table 4 for gamification elements. The results indicated that there were no significant difference in respectful behaviors toward parents based on gender, income, and the number of family members. Hypothesis 1 was therefore not supported.

There were differences in some preferred gamification elements based on demographics. There was a significant difference in avatars based on the extent to which a parent knew the favorite applications of the child ($F = 7.51$, $p < 0.001$) and based on the extent to which a child discussed favorite applications with parents ($F = 6.12$, $p < 0.01$); however, there were no significant differences in avatars based on gender, type of applications, type of activities, and daily hours. There was a significant difference in points based on the type of applications used by the child ($F = 9.12$, $p < 0.01$), type of activities practiced by the child on a smart device ($F = 5.09$, $p < 0.05$), and the extent to which a parent knew the favorite applications of the child ($F = 8.40$, $p < 0.05$); however, there was no significant differences in points based on gender, daily hours, and discussion with child. There was a significant difference in coins based on daily hours spent on smart devices ($F = 8.90$, $p < 0.05$) and the extent to which children discussed favorite applications with parents ($F = 5.49$, $p < 0.01$); however, there was no significant differences in coins based on gender, type of applications, type of activities, and knowledge of favorite app. There was a significant difference in stars based on the extent to which a parent knew the favorite applications of the child ($F = 7.57$, $p < 0.001$); however, there were no significant differences in stars based on gender, type of application, type of activities, daily hours, and discussion with child. A significant difference was also observed in levels of difficulty based on gender (F =11.51, p <0.01), daily hours a child spent on smart devices ($F = 4.30$, $p < 0.01$), the extent to which the parent knew favorite applications of the child ($F = 6.07$, $p < 0.05$), and the extent to which children discussed favorite applications with parents ($F = 4.97$, $p < 0.01$); however, there was no difference in levels of difficulty based on type of applications and type of activities. There was a significant difference in leaderboards based on the extent to which a parent knew the favorite applications of the child ($F = 5$, $p < 0.01$); however, there were no differences in leaderboards based on gender, type of application, type of activities, daily hours, and discussion with child. A significant difference in rewards was recorded based on the extent to which children discussed favorite applications with parents ($F = 6.28$, $p < 0.01$); however, there were no

Table 1: Sample characteristics.

	Frequency	Percent
Child relationship		
Mother	290	86.8
Father	10	3
Other	34	10.2
Child gender		
Boy	176	52.7
Girl	158	47.3
Place of residence		
City	311	93.1
Village	23	6.9
Marital status		
Married	307	91.9
Widowed	9	2.7
Divorced	18	5.4
The number of family members		
2–3	50	15
4–6	226	67.6
7–10	54	16.2
More than 10	4	1.2
Monthly income		
Less than 3,000 riyals	46	13.8
3,000–7,000 riyals	75	22.5
7,000–10,000 riyals	84	25.1
More than 10,000 riyals	129	38.6
The average daily hours the child spends with a smart device		
1	68	20.4
2	82	24.6
3	67	20
4	45	13.5
5	35	10.5
6	37	11
Type of applications		
Entertainment cartoons	201	60.2
Educational cartoon videos	149	44.6
Video games	198	59.3
For which of these activities does your child use a smart device?		
Drawing and coloring	126	37.7
Taking pictures	113	33.8
Video recording	92	27.5
Reading stories	49	14.7
Watching videos	261	78.1
Playing gaming applications	254	76
Learning and studying	179	53.6
Listening to songs	107	32
Viewing images	95	28.4
Other	9	2.7
To what extent do you know the child's favorite apps (games, educational ... etc.)		
Great knowledge	160	47.9
Medium knowledge	120	35.9
Limited knowledge	45	13.5
I do not know anything	9	2.7
Does your child discuss favorite apps with you?		
Yes, continuously	179	53.6
Yes, to a limited extent	123	36.8
Not at all	32	9.6

significant differences in rewards based on gender, type of application, type of activities, daily hours, and knowledge of favorite applications. There was a significant difference in unexpected rewards based on the extent to which parents knew the favorite application of the child ($F = 3.30$, $p < 0.05$) and the extent to which children discussed favorite applications with parents ($F = 6.56$, $p < 0.01$); however, there were no significant differences in unexpected rewards based on gender, type of applications, type of activities, and daily hours. There was a significant difference in interaction with others based on type of application ($F = 5.13$, $p < 0.05$), type of activities ($F = 4.97$, $p < 0.05$), daily hours spent on smart devices ($F = 4.30$, $p < 0.01$), and the extent to which a child discussed favorite applications with parents ($F = 4.48$, $p < 0.01$); however, there was no significant difference in interaction with others based on gender and knowledge of favorite applications. There was also a significate difference in progress roadmap based on daily hours spent on smart devices ($F = 2.99$, $p < 0.05$), parents' knowledge of favorite applications of the child ($F = 4.70$, $p < 0.01$), and the extent to which a child discussed favorite applications with parents ($F = 8.78$, $p < 0.01$); however, no significant differences in progress roadmap based on gender, type of applications, type of activities, and daily hours were found. Finally, a significant difference in feedback was found based on types of application ($F = 9.12$, $p < 0.01$), type of activity ($F = 7.22$, $p < 0.01$), and the extent to which a child discussed favorite applications with parents ($F = 7.12$, $p < 0.01$); however, no significant differences in feedback were found based on gender, daily hours, and knowledge of favorite app. Hypotheses 2 and 3 had multiple components; some were verified and others were not. Therefore, the second and third hypotheses were partially supported.

To test hypothesis 4, a multiple regression analysis was performed with gamification elements as independent variables and respectful behaviors toward parents as the dependent variable, with demographics as control variables. The results of the multiple regression analysis are summarized in Table 5. Playing games with points was associated with an increase in respectful behaviors toward parents ($\beta = 0.04$; $p < 0.05$). Playing games that provide rewards was also associated with an increase in respectful behaviors

Table 2: Descriptive statistics.

Variable	Mean	SD	Min	Max
Respectful behaviors toward parents	50.3	7.25	0	63
Avatars	2.22	1.06	0	3
Points	2.22	0.97	0	3
Coins	2.26	0.94	0	3
Stars	2.34	0.91	0	3
Levels of difficulty	2.11	1.01	0	3
Leader boards	1.93	1.08	0	3
Rewards	2.42	0.90	0	3
Schedule and countdown	1.58	0.98	0	3
Unexpected rewards	2.20	1.07	0	3
Interaction with others	1.96	1.07	0	3
Progress roadmap	2.09	1.00	0	3
Feedback	2.39	1.96	0	3

Table 3: ANOVA tests for respectful behaviors toward parents.

Factor	Respectful behaviors toward parents	
	F	p
Gender of child	1.60	0.206
Income	1.91	0.127
Number of family members	1.38	0.247

toward parents ($\beta = 0.07$; $p < 0.01$), as was playing games that required interaction with others ($\beta = 0.05$; $p < 0.01$). Having a medium and great knowledge of children's favorite apps was associated with an increase in respectful behaviors toward parents ($\beta = 0.23$, $p < 0.05$ and $\beta = 0.28$, $p < 0.05$, respectively). Likewise, discussing favorite apps with children was also correlated with an increase in respectful behaviors toward parents ($\beta = 0.16$; $p < 0.05$). Playing activities that involved learning, studying, and reading stories was associated with an increase in respectful behaviors toward parents ($\beta = 0.13$, $p < 0.05$ and $\beta = 0.19$, $p < 0.01$, respectively). In sum, some gamification elements exhibited a significant relationship with respectful behaviors toward parents in children aged 5–7 years. Therefore, hypothesis 4 was partially supported.

The average number of daily hours spent by a child on smart devices was negatively related to respectful behaviors toward parents ($\beta = -0.03$; $p < 0.001$). Being raised by people other than parents was also negatively related to respectful behaviors toward parents ($\beta = -0.14$; $p < 0.05$). The marital status of parents was also related to respectful behaviors toward parents: compared to married status, divorced status was negatively related to respectful behaviors toward parents ($\beta = -0.21$; $p < 0.01$).

4. Discussion

The aim of this study was to build a gamification application that can enhance respectful behaviors toward parents in children aged 5 to 7, to investigate the differences in respectful behaviors toward parents and gamification elements based on demographics, and to examine the contribution of gamification elements in enhancing respectful behaviors toward parents in children aged 5 to 7. The results indicated that parents needed to be acquainted with favorite applications used by their children and that children needed to be socialized with various values of respecting parents. Further, the findings indicated significant differences in gamification elements based on some demographics, but there was no significant difference in respectful behaviors toward parents. Moreover, some gamification elements exhibited significant association with respectful behaviors toward parents after controlling for demographic variables.

The results showed that children need to be better acquainted with some values of respecting parents. This corroborates previous research that showed values that children aged 4 to 12 years in Saudi Arabia were lacking, values such as leadership, respect, and independence [21]. Further, the results of this study showed significant differences in gamification elements based on demographic variables. These results are in line with previous research [22–25]. However, most of these studies found differences based on gender and age. Little is known about other demographic variables.

This study found three gamification elements that contributed to respectful behaviors toward parents in children. These elements were points, rewards, and interaction with others. These findings are in line with those of previous studies [21, 26, 27]. A study conducted by Barata et al. [26] compared gamified versions and nongamified versions of a course for university students. They found that using points, progress levels, leaderboard, challenges, and badges increased students' participation, engagement, and scores. Using gamification elements such as points and rewards increased task completion rates, which led to more motivated and better engaged children (age 5 to 7) in laboratory studies [27]. AlBalawi et al. [21] suggested teaching values to young children (age 4 to 12) by using some gamification elements like challenges, levels, leaderboards, achievement badges, recognition boards, progress bar, and virtual gifts.

Table 4: ANOVA tests for gamification elements.

Factor	Gender		Types of applications		Types of activities		Daily hours		Knowledge of favorite app		Discussion with child	
	F	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*	*F*	*p*
Avatars	1.77	0.184	2.01	1.890	2.08	0.456	0.69	0.626	7.51	<0.001	6.12	<0.01
Points	2.90	0.89	9.12	<0.01	5.09	<0.05	1.22	0.295	8.40	<0.05	2.15	0.117
Coins	4.97	0.26	2.12	0.162	3.12	0.123	8.90	<0.05	1.85	1.35	5.49	<0.01
Stars	0.22	0.633	1.34	0.215	1.45	0.243	2.15	0.059	7.57	<0.001	2.35	0.096
Levels of difficulty	11.51	<0.01	0.43	0.654	4.12	0.101	4.30	<0.01	6.07	<0.05	4.97	<0.01
Leader boards	2.05	0.153	2.76	0.213	2.39	0.159	0.76	0.580	5	<0.01	2.84	0.059
Rewards	2.80	0.095	3.15	0.09	4.01	0.122	1.72	0.129	2.32	0.07	6.28	<0.01
Schedule and countdown	0.134	0.714	2.14	0.121	3.23	0.321	0.20	0.959	1.52	0.208	2.18	0.114
Unexpected rewards	2.93	0.99	1.12	0.867	2.34	0.201	1.31	0.256	3.50	<0.05	6.56	<0.01
Interaction with others	2.47	0.117	5.13	<0.05	4.97	<0.05	4.30	<0.01	1.83	0.141	5.48	<0.01
Progress roadmap	0.006	9.38	3.14	0.124	2.98	0.202	2.99	<0.05	4.70	<0.01	8.78	<0.001
Feedback	1.57	0.210	9.12	<0.01	7.22	<0.05	0.99	0.440	1.85	0.137	7.12	<0.01

Gamification elements have been applied in healthy lifestyle education for children (aged 8 to 12) [28] and in learning the Chinese language for primary school students [29]. However, Chevtchenko [30] found that feedback was the main element of gamification which contributed to motivating children (7–8 years old) and raising their academic level. The age differences may explain these differences in findings between the last two studies.

The mechanisms by which gamification elements impact children's attitudes are to be found in the theoretical foundations of gamification. Several theoretical models on how gamification elements trigger and motivate desired behavior in children have been proposed. The Fogg behavior model (FBM) is a model for understanding human behavior proposed by Fogg [31]. According to this model, three elements (motivation, ability, and triggers) must converge at the same time for a target behavior to occur. To perform some desired target behavior, a person must be sufficiently motivated, have the ability to perform the behavior, and be triggered to perform it. The FBM is a conceptual framework with relevance to persuasive technology, defined by Fogg as a kind of technology to automate behavior change. The FBM framework also provides insights about how to use persuasive design to trigger desired behaviors and increase motivation. The second theory is the flow theory, also called the optimal experience [16]. According to the flow theory, a person must be motivated intrinsically to do the activity, and then the person can be kept in a state of flow if there is a balance between the person's skills and the challenge the person must face. The challenge/skill balance concept plays a key role in the definition of flow [16]. The third theory is the self-determination theory (SDT) proposed by Deci and Ryan [18], which is a framework for studying human motivation and personality. SDT focuses on three essential psychological needs: autonomy, competence, and relatedness. These three psychological needs are usually present in games, and therefore they are responsible for the engagement and wellness that players feel.

This study also found that when parents had knowledge of and discussed favorite games played by their children, it was associated with an increase in respectful behaviors toward parents. It is possible that parent-child communications enhance child attitudes [32]. Using a smart device for learning and studying and for reading stories was also related to increased respectful behaviors toward parents compared to other activities. Although some elements of gamification were associated with increase in respectful behaviors toward parents, the number of hours the child spent using a smart device was negatively related to respectful behaviors toward parents. This is in line with what was found previously that time spent using smart devices was correlated with parent-child interactions [33]. In terms of marital status, compared to being married, being divorced was negatively related to children's respectful behaviors toward parents. This is in accordance with the results of Alharbi [34], who found that when parents do not live together, the level of emotional intelligence of their child decreases.

5. Future Work

This study has implications for planning future work. This study found evidence that gamification elements could be useful in instilling desired values in children. Future research should focus on testing this approach in children of different age ranges. This would allow researchers to see if some specific elements are more effective for specific age ranges of children. Further, more research and development in the gamification field is welcome to diversify the gamification framework and applications that can be used to enhance different desired values in children. It would also be interesting to investigate how different gamification approaches and applications may be disproportionately effective for various demographic profiles of children.

Table 5: Multiple regression predicting respectful behaviors toward parents.

Variable	β	SE	p
Intercept	1.97	0.13	<0.001
Avatars	_0.001	00.1	0.996
Points	0.04	0.02	<0.05
Coins	0.008	0.02	0.730
Stars	-0.006	0.02	0.778
Levels of difficulty	0.01	0.02	0.551
Leaderboards	-0.007	0.01	0.705
Rewards	0.07	0.02	<0.01
Schedule and countdown	0.008	0.02	0.698
Unexpected rewards	0.01	0.02	0.571
Interaction with others	0.05	0.01	<0.01
Progress roadmap	-0.02	0.02	0.281
Feedback	0.009	0.01	0.962
Child relationship (ref. mother)			
Father	0.17	0.09	0.08
Other	-0.14	0.06	<0.05
Child gender (ref. boy)			
Girl	-0.02	0.03	0.445
Place of residence (ref. City)			
Village	-0.13	0.07	0.06
Marital status (ref. married)			
Widowed	-0.05	0.11	0.590
Divorced	-0.21	0.07	<0.01
The number of family members (ref. 2, 3)			
4–6	0.005	0.04	0.912
7–10	-0.007	0.06	0.909
More than 10	0.03	0.15	0.800
Income (ref. less than 3,000 riyals)			
3,000–7,000 riyals	0.01	0.05	0.830
7,000–10,000 riyals	-0.009	0.05	0.873
More than 10,000 riyals	-0.01	0.05	0.852
The average daily hours the child spends with a smart device	-0.03	0.01	<0.001
Type of applications (ref. entertainment cartoons)			
Educational cartoon videos	0.08	0.06	0.201
Video games	-0.07	0.05	0.202
Type of activities (drawing and coloring)			
Taking pictures	-0.09	0.07	0.123
Video recording	-0.03	0.10	0.135
Reading stories	0.19	0.05	<0.01
Watching videos	-0.07	0.09	0.202
Playing gaming applications	0.08	0.06	0.093
Learning and studying	0.13	0.03	<0.05
Listening to songs	0.09	0.05	0.071
Viewing images	-0.03	0.08	0.111
Other	0.04	0.04	0.134
To what extent do you know the child's favorite apps (games, educational … etc.) (ref. I do not know anything)			
Limited knowledge	0.22	0.11	0.051
Medium knowledge	0.23	0.10	<0.05
Great knowledge	0.28	0.11	<0.05
Does your child discuss favorite apps with you? (ref. not at all)			
Yes, to a limited extent	0.15	0.06	<0.05
Yes, continuously	0.16	0.06	<0.05
Adjusted R squared	**0.328**		**<0.001**

This study has some limitations to be mentioned. First, we relied on the responses from the perception of parents about their children. Second, the design was cross-sectional; quasi-experimental designs might bring further insights.

6. Conclusion

In light of the general directives for the methodological designs proposed in the previous studies and after following a number of procedures such as building the matrix, consulting a team of experts in early childhood development, and applying some tools, the proposed vision was created for the application of gamification to instill knowledge and practices to develop respectful behaviors toward parents in children aged 5–7 years. To create the proposed application, the researchers adopted children's favorite elements of gamification as reported by their parents. The results showed that the gamified application with two interfaces could be used in order to enhance respectful behaviors toward parents in children. The study found three elements that emerged as important contributors—namely, points, rewards, and interaction with others. It is important that programs that aim to develop desired behavior use gamification approaches and pay attention to these three elements in this age range. However, the time spent using smart devices must be rigorously controlled by parents to expect a better outcome, as spending more time might reverse the impact.

Appendix

A. Interactive Application Components

The results of the study indicate the need for children to learn the following knowledge and practices:

(1) The concept of respecting parents

(2) The value of respect and kindness to parents, such as respecting times when family members do not want to be disturbed, speaking to their parents and the elderly with respect, and appreciating what their parents do for them

(3) Helping family members in doing household chores and caring about personal belongings

(4) Using polite words, apologizing to parents, and treating family members with kindness and respect

(5) Responding to parents, identifying what upsets them and what pleases them, and doing required tasks voluntarily

Accordingly, the interactive application components were built. The application offers two interfaces: one for the child and another for the parents. The gamification methods were based on data collected via questionnaire as the methods preferred by children aged 5–7 in Saudi Arabia and included the following: stars, feedback, time, imaginary characters (avatars), rewards, tasks, countdown, unprecedented rewards, and progression map. The child's interface comprised the following:

(1) Selecting an imaginary character for the child's account

(2) Visual stories and songs that help the child to understand the concept of respecting parents, the outcomes of being dutiful to the parents, and manners of interacting with parents

(3) The exploring emotion guessing game, which serves to develop the child's ability to show empathy. The idea of the game revolves around animated daily situations whereby the child must discover the feeling of a family member and the cause of that feeling. Then, the child must choose the appropriate way to change the feeling. This game is also linked to respectful behaviors toward parents, siblings, and surroundings

(4) The parental recognition game, which motivates the child to recognize parental preferences, which in turn may direct children in the future to be close to their parents and to know what they love and what they dislike. In this game, children decide parents' preferences and color them. Eventually, the preferences will be shown on one page and can be shared with the parents

(5) The wheel game, which urges children to make positive initiatives in which they express their affection toward parents; children can record voice files or send pictures and videos to parents explaining what they did for them

(6) A to-do list that the parent organizes in advance into home, health, and behavioral tasks. The parent can also add other categories by recording voice files, sending pictures, or writing

(7) The rewards page, where children collect stars that guide them to select the appropriate gift and send the selection to the parents

(8) Feedback after each activity, which contains encouraging sounds and motivational phrases about honoring parents

The parent's interface comprises the following:

(1) A record of the child and the addition of the parent as a supervisor

(a) A to-do list that is organized by one of the parents daily or monthly. Stars are to be defined for each task, and the parent can record the task as a voice message, send it as a picture, or write it. In addition, the duration should be set for each task

(b) An icon to receive and share the children's messages, and the parent responds to them either by voice or with stickers added on the parent's interface

(c) Educational guidance messages are sent once a week to demonstrate respect to parents

(d) A space for contemplative writing with an explanation of the correct writing strategy and its importance in improving this aspect for the parents

(e) The possibility of sending a surprise to the child

(f) The possibility of assigning children to a group task

B. Questionnaire on Parental Obedience

(1) The child knows the meaning of righteousness toward parents

(2) The child knows behaviors that please parents

(3) The child expresses emotions for the parents, behaviorally or verbally

(4) The child performs the tasks assigned by the parents (if they are age-appropriate)

(5) The child establishes eye contact with parents while speaking

(6) The child offers to help parents in household chores

(7) The child sympathizes with parents when one of them is sick or stressed

(8) The child respects the family members' rest time

(9) The child talks to parents politely

(10) The child thanks parents when they do something for him

(11) The child appreciates parent's efforts

(12) The child cooperates with the family in household chores

(13) The child cooperates with parents to look after some family members (grandmother, grandfather, or younger siblings).

(14) The child shows respect for household belongings

(15) The child keeps his personal belongings neat and tidy

(16) The child requests something from parents politely and kindly

(17) The child apologizes to parents when making a mistake without being asked

(18) The child deals kindly with family members

(19) The child responds positively to what parents ask or forbid him to do

(20) The child expects things that make parents happy or angry and initiates or refrains from doing them without being asked

(21) The child obeys parents even if it is contrary to his desire. For example, I ask him to turn off the television, so he obeys out of love for me and not out of fear of punishment for wanting to watch it

Data Availability

Data available on request contact to request the data by email: isoroor@kau.edu.sa.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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