Learning to play: understanding in-game tutorials with a pilot study on implicit tutorials

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ABSTRACT

Tutorials are essential strategies used by game designers to improve video games' playability. The concept of “learning to play” exemplified by game tutorials also seems potentially related to game-based learning, but studies on game tutorials still appear scant. In order to support more in-depth researching on in-game tutorials and contribute to the current understanding of players' gameplay learning, this paper performed a literature review on research of game tutorials and revealed five commonly reported features of in-game tutorials. First, tutorials are typically considered more significant for games with complex gameplay. Second, players' gaming proficiency should be consulted when studying in-game tutorials. Third, the tutorials may be more effective when players can practice on their own and receive timely feedback. Fourth, providing players with just-in-time access to tutorials was thought to have a positive effect on their learning of the gameplay. Finally, the research in this area had been reported as deficient until 2017. Based on the literature review, a pilot study on implicit game tutorials was conducted to explore a more effective form of in-game tutorials. Using a designed questionnaire, the pilot study performed a quantitative analysis on recruited players’ feedback and in-game performance and tested the results against five hypotheses established upon the literature review. It suggested that providing players with implicit guidance and gamified instructive elements in the tutorial section can improve their in-game perceptions, and implicit tutorials are especially beneficial for players experienced in gaming. This study extended the previous studies on game tutorials and may contribute to the follow-up studies on game tutorials.

1. Introduction

Previous studies have shown video games as a positive factor for well-being and education (Jones et al., 2014; Young et al., 2012). Video games specially designed for improving life qualities or training purposes have also been rapidly growing since the early 2000s, which are termed “serious games” in academia (Laamarti et al., 2014). As these games have been thought to have practical value for educational and training purposes, studies into serious games have also introduced the concepts of “game-based learning” and “educational games” (Vandercruysse et al., 2012). These concepts highlight how games’ recreational value and interactivity could be utilized to persuade their audience into acquiring new skills and knowledge or forming beneficial habits. The rise of game-based learning exemplified how playing was helping people learn, while it also raised the opposite question of how people could learn to play video games.

Studying in-game tutorials might offer a sensible answer to this question. Under the context of game design, the terminology “tutorial” often refers to the strategies adopted by game designers to communicate the expected gameplay to players. Studying game tutorials can be necessary and meaningful for understanding game design and players’ learning behaviour in the context of video games. Many scholarly works have discussed serious or educational games, but research on in-game tutorials appears relatively scant (Godin, 2012, pp. 1–2; White, 2012a, p. 5). There are also inconsistencies and deficiencies in existing literature related to game tutorials. This paper reviews existing literature on in-game tutorials and documents a pilot study about implicit in-game tutorials. This study supports the feasibility of formally studying implicit game tutorials and might contribute to comprehending the process of gameplay learning.

1.1. In-game tutorials

In most cases, in-game tutorials, or game tutorials, are the instructive contents in video games to familiarize players with the gameplay. A related terminology in in-game tutorials is the “game mechanics”, which
can be defined as the rules or “methods invoked by agents for interacting with the game world” (Sicart, 2008, para. 71). Effective tutorials help players understand particular game mechanics or teach them to trigger certain behaviour in the game world. Existing literature differs in the definition of in-game tutorials. In some writings, game tutorials specifically describe the informative scenes at the beginning of a game. In other works, tutorials might also indicate the general content that guides game players. In this paper, tutorials refer to the scenarios, levels, or guidelines designed to teach players the expected approach to experiencing a video game. The prefix “in-game” emphasizes that these tutorials are part of the games rather than external instructions.

Tutorials have been widely used in game design. They typically appear at the early stage of a video game to assist players’ initial play (Cheung et al., 2014) but may also exist in the middle or late stages of a game. An example is Nintendo’s Wario Land 3 (Nintendo Research and Development 1, 2000), in which players can unlock new tutorials with their game progress. Historically, it was already a practice in the 1980s to insert implicit or explicit tutorials in early scenes of a video game, although guidance was primarily provided in external manuals at that time (Therrien, 2011, p. 3). After the late 1990s, the rising complexity of video games seems to have increased tutorials’ importance. Tutorials now exist more extensively in games. Even in Minecraft (Mojiang Studios, 2020), a sandbox game that strongly emphasizes players’ free exploration of the game world, tutorials are presented through pop-up dialogues and an achievement system. In-game tutorials have superiority over external guidance because they can be combined with the game context and provide timely assistance (Andersen et al., 2012, p. 60). Ernest Adams also suggested that tutorials should be expected in most modern commercial games unless the gameplay is extremely simple (Adams, 2009, p. 375).

Existing studies have demonstrated that well-designed game tutorials improve video games’ approachability and players’ engagement (Andersen et al., 2012; Desurvire and Wiberg, 2010). Furthermore, studying in-game tutorials has a richer practical value at present. It was found that controllability and a “sense of agency” help create immersive feelings (David et al., 2008). As tutorials can help develop players’ controllability over games, studying them might potentially benefit the design of immersive experiences. Additionally, the development of new technologies has empowered more forms of interactive media. It increases game tutorials’ value as an approach to familiarizing players with the novelty arising with these new media forms, such as Virtual Reality (VR; Frommel et al., 2017) and location-based games (Konnolä et al., 2018). In the emerging field of e-sports, exploring more effective forms of game tutorials also responds to the demands for training players’ gaming professionalism. Apart from these significances, the knowledge acquired from studying game tutorials might also apply to the design of educational games, which will be meaningful for designers and researchers of both casual and serious games.

2. Literature review

This literature review on in-game tutorials started with searching on Google Scholar and Microsoft Academic Search. The retrieved works were from several academic databases, including Springer Link, ScienceDirect, ACM Digital Library, MDPI, and Semantic Scholar. The searched keywords were “in-game tutorial”, “game tutorial”, and “in-game instruction”. Using the keyword “instruction” instead of “tutorial” seemed to lead to more results. For instance, searching “in-game instruction” showed 8,658 results on Springer Link when the search was conducted (December 28, 2021), while “in-game tutorial” only had 2,601 results. After eliminating unrelated, inaccessible, duplicate, or non-academic sources and checking the bibliographies of the first reviewed papers, 15 publications and 6 theses were methodically reviewed. These works were mainly from the field of human-computer interaction (HCI), and literature on education and artificial intelligence (AI) were also included.

2.1. Review of previous studies

The conference paper “The impact of tutorials on games of varying complexity” by Erik Andersen et al. (2012) seems to be an influential work in understanding in-game tutorials. This paper was published relatively early and systematically studied multiple types of game tutorials, providing a preferable reference for follow-up researchers. Among the sixteen reviewed works published after it, ten papers cited it in their bibliography. In this conference paper, the authors created three computer games and analyzed the experience data from 45,000 online players. Their analysis showed two notable findings. First, game tutorials can significantly improve players’ engagement in games that are complicated and unconventional, but they may not be as useful for simple games. Second, grouping tutorials with what they teach enhances tutorials’ efficiency, which the authors defined as the “context-sensitivity” of tutorials.

The outcomes of Andersen and others were deepened by Mario Passalacqua et al. (2020). In the journal article of Passalacqua and others, the variable of player expertise was introduced, and psychological assessments were used to measure players’ reactions to a tested mobile game. They found that in simple games, while the conclusion of Andersen and others applies to the players familiar with gaming, tutorials can positively influence unskilled players’ perceived flow, and players’ perceived flow positively correlates with their willingness to play a game continuously. Their result demonstrated the significance of considering surveyed players’ gaming backgrounds in studying game tutorials.

Another highly relevant work is the Game Approachability Principles (GAP) proposed by Desurvire and Wiberg (2010). The GAP consisted of ten principles and aimed to improve games’ approachability to casual players. Based on the concept of Heuristic Evaluation and Usability Testing, Desurvire and Wiberg provided a standard process for designers to evaluate their game tutorial design with these principles. The GAP suggested that effective game tutorials give players adequate opportunities to practice, be presented in multiple forms, give players timely feedback, satisfy players’ self-efficacy, be entertaining, and provide on-demand accessibility.

Works on educational technology also contributed to understanding game tutorials. In White’s (2012b) journal article, the author used an instructional design model to design tutorials for a commercial video game. His study showed that auditory plays a crucial role in players’ perception of game tutorials, extending his doctoral dissertation (2012a). The paper of Shannon et al. (2013), from another direction, attempted to optimize an educational game by developing in-game tutorials. A conclusion shared by the two works was that players seem to prefer just-in-time scaffolded instructions from game designers. These two papers also reflected the mutual support between game tutorial design and instructional design, indicating the value of studying game tutorials for both casual and educational games.

In addition, four published papers in the field of AI were found discussing the automation of game tutorial design (Aytemiz et al., 2018; Benotti and Bertoa, 2011; Branzavan et al., 2009; Green et al., 2018). Two reviewed articles from HCI-related publications also explored new forms of external guidance for video games (Payne et al., 2017; Wohle et al., 2013). Therrien’s (2011) study examined the history of the in-game assistance paradigm, and game tutorials in the narrow sense (instructive scenes in the early stages of a game) were classified as a type of assistance system in his review. Hagen’s (2013) research attempted to replace tutorials in simple game with an augmented graphical user interface. Cheung et al. (2014, pp. 57–59, 65) discussed the relationship between tutorials and players’ initial play and reported that the surveyed players tended to skip tutorials to gain a better experience. Frommel et al. (2017) applied the findings of Andersen and others in VR environment and supported the validity of “context-sensitivity” for game tutorials.

Based on this literature review, five commonly-reported attributes about in-game tutorials were revealed. First, game complexity is closely associated with in-game tutorials (Andersen et al., 2012, pp. 65–66;
Versions for comparative analysis. The two versions were distinguished by whether the game's tutorial was implicit or explicit, so they were named the “implicit version” (IV) and the “explicit version” (EV). The tutorials in both versions were designed to familiarize players with the game mechanics before their formal play, but IV's tutorial resembled a formal game level, while EV used apparent and detailed instructions. The research material included an Android game, a questionnaire, and data analysis software. A questionnaire was delivered to collect players' feedback on the game. Referencing the GAP (Desurvire and Wiberg, 2010) and the survey design of Clark et al. (2020), the questionnaire for this research asked the players to evaluate the non-tutorial part in terms of playability, difficulty, and perceived enjoyment. The variable playability was added to assess whether the game was friendly to the players, and the variable enjoyment measured players' subjective feelings about the gameplay. Apart from the non-tutorial ratings, the tutorial part was evaluated regarding its perceived helpfulness and boredom. There existed a difference that the non-tutorial ratings were based on percentages, while the tutorial part used a five-point Likert scale. The standard for the percentage scoring was that 70 points or more represented significance. Demographic information, including age, gender, and gaming ability, was also collected to layer the players. The variable of gaming ability sorted players as inexperienced, medium, and experienced. After the data was collected, IBM SPSS 28.0 was used for analysis.

3.2. Material

The research material included an Android game, a questionnaire, and data analysis software. A questionnaire was delivered to collect players' feedback on the game. Referencing the GAP (Desurvire and Wiberg, 2010) and the survey design of Clark et al. (2020), the questionnaire for this research asked the players to evaluate the non-tutorial part in terms of playability, difficulty, and perceived enjoyment. The variable playability was added to assess whether the game was friendly to the players, and the variable enjoyment measured players' subjective feelings about the gameplay. Apart from the non-tutorial ratings, the tutorial part was evaluated regarding its perceived helpfulness and boredom. There existed a difference that the non-tutorial ratings were based on percentages, while the tutorial part used a five-point Likert scale. The standard for the percentage scoring was that 70 points or more represented significance. Demographic information, including age, gender, and gaming ability, was also collected to layer the players. The variable of gaming ability sorted players as inexperienced, medium, and experienced. After the data was collected, IBM SPSS 28.0 was used for analysis.
scene and a non-tutorial level. Players would first complete the tutorial to learn the game mechanics. Afterwards, they would unlock the non-tutorial level, which tested the tutorial's effect by assessing their mastery of the mechanics through five achievements. The first four achievements tested players' understanding of specific mechanics, while the last one required them to defeat the game's boss, the Wolf Leader, to test their overall proficiency.

The game included six core mechanics, with four basic ones and two advanced ones (see Table 1). The four basic mechanics were “jumping”, “sliding”, “enemies”, and “bonus”. The jumping and sliding mechanics were easy and conventional, which mostly imitated the game Cookie Run (Devisisters, 2013). The bonus system guided players to collect Mana as rewards, while the enemies were added to punish the players for unskilled manipulations. To be specific, the game had four types of enemies, namely Arrows, Crazy Wolves, Iron Ball Wolves, and the Wolf Leader. The two advanced mechanics were “position swap” and “ground pound”. They were distinguished because they were unconventional and required complex manipulation. For example, the position swap mechanic required players to touch enemies on the screen quickly and switch from their default controlling gesture of putting both hands at the bottom of the screen. The ground pound mechanic was triggered when players pressed the slide button immediately after pressing the jump button, combining the jumping and sliding mechanics.

The difference between the two versions only existed in the tutorial scene (see Figure 1). In the implicit tutorial, instructive elements were combined into the game level as decorations, and keywords that helped players understand the gameplay were highlighted in the narrative lines. These designs aimed to disguise the instructional elements as part of a formal game level. In the explicit tutorial, players’ control was guided by the game, and guidelines appeared at certain positions to introduce the game content. This detailed tutorial explained the gameplay to players more precisely but might isolate the instructive elements from the game context.

### 3.2.3. Sample

Until August 20, 2021 when the participant recruitment terminated, there were 56 participants contacted, and 47 participants submitted their experience data. Table 2 demonstrates an overview of the samples based on their demographic information. Among all the participants, twenty were college students at Xi’an Jiaotong-Liverpool University (XJTLU). The IV game was first published and received 26 available responses, and 21 available samples were collected in EV. No duplicate samples were found among the responses. Males accounted for the majority of the samples. The IV samples were comprised of 16 males (34.0% of all 47 samples) and 10 females (21.3%), and the EV samples had 14 males (29.8%) and 7 females (14.9%). Therefore, the male-to-female ratio was two-to-one for EV and eight-to-one for IV (29.8%).

The samples were collected in EV and IV. Therefore, the male-to-female ratio was two-to-one for EV and eight-to-one for IV (29.8%).

| Mechanic | Type | Difficulty | Corresponding achievement |
|----------|------|------------|----------------------------|
| **Basic mechanics** | | | |
| Jumping | Control | 1/5 | #1: Jump quickly after sliding to collect Mana. |
| Sliding | Control | 2/5 | #1: Jump quickly after sliding to collect Mana. |
| **Enemies** | Element | 3/5 | #3: Avoid the arrow rain perfectly. #5: Defeat the Wolf Leader. |
| **Bonus** | Element | 1/5 | #1: Jump quickly after sliding to collect Mana. #2: Fall swiftly to collect Mana. |
| **Advanced mechanics** | | | |
| Position swap | Control | 5/5 | #4: Defeat the Crazy Wolf with position swap. |
| Ground pound | Control | 4/5 | #2: Fall swiftly to collect Mana. |

and three older than 40. In addition, most players reported their gaming ability as medium-levelled. Three inexperienced, five experienced, and thirteen medium players were found in EV. For IV, both experienced and inexperienced levels were found by five participants, while the other 16 participants reported themselves as medium-levelled. One participant in EV did not classify himself in any ability group and commented that he played video games but did not prefer mobile ones. This participant was sorted in the medium level for the analysis.

### 3.2.4. Procedure

The questionnaire was produced at the earliest stage of this research. The sample game was then produced and distributed to the participants. The participants were mainly recruited through social platforms and online forums. As this pilot study was a part of XJTLU’s Summer Undergraduate Research Fellowships programme, some participants were contacted through the university's online platform. A poster with two QR codes was posted online. One QR code instructed the participants to download the game, complete the tutorial, and try the non-tutorial level five times. The other asked the participants to complete the questionnaire after their gameplay. Little Red Riding Hood: The End of Loop had a game performance recording system that automatically tracked players’ performance in their first five plays of the non-tutorial level. The tracked information contained their highest game score and number of completed achievements. Participants could attach the achievement code generated by the game to their questionnaire to provide their in-game performance. However, two participants failed to upload their achievement codes, so the game performance analysis only had 45 samples. A Java program was designed to decode the achievement code, which records the players’ scores and completions of achievements as a long string of texts, into two readable data attributes to be categorized with SPSS for analysis.

Based on the Shapiro-Wilk test, the statistics of non-tutorial ratings were normally distributed, while the results of the tutorial review and game performance were non-normally distributed. Therefore, the Independent-Samples T-test was used to analyze the correlation between the non-tutorial ratings and tutorial implicitness, and the Mann-Whitney U test was adopted for players’ tutorial review and game performance. The Pearson Chi-Square test was also used to examine the completion of each certain achievement. The standard of statistical significance in this study was set at $p = 0.05$.

### 3.3. Results

Generally, the game was positively commented on regarding its graphics, narrative, and mechanics. In respondents’ comments attached to their questionnaires, twenty-three showed optimistic attitudes toward their in-game experience. Six respondents also commended the mechanic design. The negative comments were mainly about hardware problems and game difficulty. The challenging design of the non-tutorial level was severely criticized by respondents from all gaming-ability levels. Eight players in the medium group, three in the experienced group, and two in the inexperienced group argued against the game’s difficulty in their comments. Three players wrote that the final challenge was obviously more challenging than the previous ones, which discouraged them from completing all the achievements. In addition, the two versions’ tutorial designs received quite different comments. Five players of IV commented that the tutorial was hard to understand. EV was commented as helpful but boring. The explicit tutorial was condemned for being boring by five respondents. A participant even dropped out of this research, arguing that the explicit tutorial was time-wasting.

#### 3.3.1. Tutorial review

Table 3 illustrates the result of the tutorial review. The overall rating suggests that players of both the two versions tended to rate the tutorial part as helpful but boring, and the experienced players were more likely to report the tutorials as helpful. The results supported hypotheses 1 and 2.
2. The implicit tutorial was rated as .6/5.0 less boring and .69/5.0 less helpful on average, and the correlations between tutorial implicitness and both variables were statistically significant. The results suggested that players had more positive emotions experiencing the implicit tutorial than the explicit one, but the implicit tutorial was also perceived as less helpful when teaching players the gameplay. After taking the players' gaming backgrounds into consideration, the influence of tutorial implicitness was found most significant on players with medium gaming abilities and least noticeable on inexperienced players. In addition, for experienced players, the tutorial's implicit guidance did not significantly impact their perceived helpfulness, but it seemed to improve their feelings within the tutorial.

3.3.2. Non-tutorial review

The results of the non-tutorial review can be viewed in Table 4. In general, participants from both versions rated the game with high scores regarding its difficulty, but they considered the implicit version better than the explicit one when speaking of playability and enjoyment. There were no statistically significant correlations among the ratings of the non-tutorial part, so hypotheses 3 and 4 were not supported. Moreover, the variable difficulty is worth discussing in this set of data. Among the three gaming ability groups, the most significant and least significant results were both reported in this variable. In the inexperienced player group, the average difficulty of EV even reached 90.0, while it was only 69.2 for IV, which was the opposite of hypothesis 4. However, as there were only three unskilled players in EV, this result might be accidental.

3.3.3. Game performance

There are two parts to the analysis of game performance. The first part evaluates the players' overall performance concerning their highest score and total achievement completion in the first five plays, as visualized in Table 5. It shows that the players on average have a very low rate of completion of the five game achievements, which corresponds to the high scores they reported for the game's difficulty. In addition, there were likewise no statistically significant correlations in this data set, so hypothesis 5 was not supported in this part. Among the group averages of
Table 2. An overview of the samples’ demographic information.

| Group          | Sample size | IV | EV |
|----------------|-------------|----|----|
| All groups     | 47          | 26 | 21 |
| All            | 47          | 100.0% | 26 | 21 |
| Age            | Total       | Percentage | IV | EV |
| 15–20          | 8           | 17.0%    | 5  | 3  |
| 20–25          | 24          | 72.3%    | 16 | 18 |
| 25–30          | 1           | 2.1%     | 1  | 0  |
| 35–40          | 1           | 2.1%     | 1  | 0  |
| 40–50          | 1           | 2.1%     | 1  | 0  |
| ≥50            | 2           | 4.3%     | 2  | 0  |
| Gender         | Total       | Percentage | IV | EV |
| Male           | 20          | 63.8%    | 16 | 14 |
| Female         | 27          | 36.2%    | 10 | 7  |
| Gaming ability | Total       | Percentage | IV | EV |
| Inexperienced  | 8           | 17.0%    | 5  | 3  |
| Medium         | 29          | 61.7%    | 16 | 13 |
| Experienced    | 10          | 21.3%    | 5  | 5  |

Table 3. Analysis of the tutorial ratings (two-sided Mann-Whitney U test).

| Item          | Samples | Implicit mean | Explicit mean | Significance (p, approximate) |
|---------------|---------|---------------|---------------|------------------------------|
| Overall       |         |               |               |                              |
| Boredom       | 47      | 2.50          | 3.10          | .002**                      |
| Helpfulness   | 47      | 3.50          | 4.19          | .017*                       |
| Inexperienced |         |               |               |                              |
| Boredom       | 8       | 2.60          | 3.00          | .393                        |
| Helpfulness   | 8       | 3.40          | 4.00          | .786                        |
| Medium        |         |               |               |                              |
| Boredom       | 29      | 2.56          | 3.00          | .092                        |
| Helpfulness   | 29      | 3.38          | 4.15          | .068                        |
| Experienced   |         |               |               |                              |
| Boredom       | 10      | 2.20          | 3.40          | .095                        |
| Helpfulness   | 10      | 4.00          | 4.40          | .421                        |

1. Correlation significant at p < .05 (two-sided).
2. Correlation significant at p < .01 (two-sided).

Table 4. Analysis of the non-tutorial ratings (two-sided Independent-Samples T-test).

| Item          | Samples | Implicit mean | Explicit mean | Significance (p, approximate) |
|---------------|---------|---------------|---------------|------------------------------|
| Overall       |         |               |               |                              |
| Playability   | 47      | 68.73         | 64.19         | .415                         |
| Difficulty    | 47      | 70.96         | 70.71         | .962                         |
| Enjoyment     | 47      | 69.81         | 63.19         | .253                         |
| Inexperienced |         |               |               |                              |
| Playability   | 8       | 67.40         | 75.00         | .662                         |
| Difficulty    | 8       | 69.20         | 90.00         | .104                         |
| Enjoyment     | 8       | 73.40         | 68.33         | .720                         |
| Medium        |         |               |               |                              |
| Playability   | 29      | 65.81         | 62.46         | .602                         |
| Difficulty    | 29      | 70.25         | 69.15         | .861                         |
| Enjoyment     | 29      | 69.00         | 61.15         | .286                         |
| Experienced   |         |               |               |                              |
| Playability   | 10      | 79.40         | 62.20         | .256                         |
| Difficulty    | 10      | 75.00         | 63.20         | .417                         |
| Enjoyment     | 10      | 68.80         | 65.40         | .830                         |

Table 5. Analysis of the participants’ overall performance (two-sided Mann-Whitney U test).

| Item          | Samples | Implicit mean | Explicit mean | Significance (p, approximate) |
|---------------|---------|---------------|---------------|------------------------------|
| Overall       |         |               |               |                              |
| Score         | 45      | 7008.48       | 7801.80       | .120                         |
| Completion    | 45      | 32.8%         | 42.0%         | .299                         |
| Inexperienced |         |               |               |                              |
| Score         | 7       | 5914.00       | 8201.33       | .229                         |
| Completion    | 7       | 25.0%         | 33.3%         | .629                         |
| Medium        |         |               |               |                              |
| Score         | 28      | 7069.38       | 7867.00       | .133                         |
| Completion    | 28      | 27.5%         | 45.0%         | .146                         |
| Experienced   |         |               |               |                              |
| Score         | 10      | 7689.20       | 7405.60       | .690                         |
| Completion    | 10      | 56.0%         | 40.0%         | .421                         |
of complex mechanics is less influenced by the tutorial’s implicitness, but the implicit guidance can still affect their in-tutorial enjoyment and understanding of simple mechanics. It is assumed that the experienced players tended to apply their knowledge from other games of the same genre to Little Red Riding Hood: The End of Loop (LRRH), so they were concerned less about the instructions provided but cared more about their subjective feelings inside a tutorial. Hence, the vagueness of the implicit tutorial improved their in-tutorial experience and did not impede them from grasping the advanced mechanics. To conclude, implicit in-game tutorials can improve players’ game experience inside the tutorial scenario, and their benefits are exceptionally prominent for players experienced in gaming.

The results of this pilot study also extended the previous research on in-game tutorials. Differences between tutorials’ implicitness and presence were revealed. Passalacqua and others suggested that tutorials’ presence in a video game has more substantial benefits for inexperienced players’ feelings. Desurvire and Wiberg (2010, pp. 132–133) also mentioned that game tutorials are more in the interest of casual gamers. The implicit tutorials, on the contrary, seem more meaningful to experienced players, which fills the gap in the previous research and demonstrates the value of researching tutorial implicitness independently. Considering that Passalacqua and others’ research context was a simple mobile game, while LRRH was considered a difficult mobile game, research on implicit tutorials in simple games can also be performed to supplement this conclusion. Moreover, this research supported Andersen and others’ findings on tutorial and game difficulty and applied these findings to the different mechanics of the same game. This application reveals a more cost-effective approach for game studies, as creating different mechanics for the same game is usually more cost-saving than designing multiple games when the devised video games are of the same size.

4. Limitations

This study is still inadequate currently, and a formal study might be performed in the future. There are four limitations to be noted. First, professional measurement of players’ gaming background was absent. This limitation was also reported by Passalacqua et al. (2020, p. 10) and Alexander et al. (2013, p. 61). Second, the novelty and complexity of game mechanics were tested together in this study and previous studies, and their influence as an individual factor remains uncertain. Third, the participants’ game time was not recorded in LRRH, while game time was a crucial variable used in the previous studies to assess players’ intention of continuous playing. Lastly, inconsistencies in definitions exist in the reviewed literature. For instance, Andersen et al. (2012, p. 59) defined the case of Super Mario Bros. (Nintendo Research & Development No.4 Department, 1985) as a tutorial absence, but it should be an implicit tutorial according to the definition of Therrien (2011, p. 3), Lyer (2017), and this study. The dialogue guidance of Minecraft (Mojang Studios, 2020) can also be viewed as an in-game tutorial within White’s (2012b, p. 32) context and this study, but it would be categorized as a hint system in Therrien’s (pp. 3–4) taxonomy.

5. Conclusion

This paper examined the existing literature on in-game tutorials and proposed a pilot study on implicit game tutorials. In the literature review, five commonly reported attributes of in-game tutorials were revealed, while inconsistencies in definitions were also found. The pilot study discussed a design strategy for in-game tutorials originating from the 1980s console games called implicit tutorials. By comparing the user data of a mobile game’s two versions, it was found that providing implicit guidance can improve players’ enjoyment inside a specific tutorial section in video games, and implicit tutorials can be especially beneficial for players with profound experience in gaming. It also demonstrated some similarities and differences between game tutorials’ implicitness and presence. Nonetheless, a formal study might still be expected due to the limitations of this pilot study. Three potential directions for future studies were also suggested: The first direction is to develop a professional method for evaluating players’ background knowledge of gaming. The second is to explore the relationship between game mechanics’ novelty and complexity. The third is that terminology unification might be necessary for the realm of game studies.

Declarations

Author contribution statement

Shuangyuan Cao: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.
Fang Liu: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data included in article/supp. material/referenced in article.

Declaration of interest’s statement

The authors declare no conflict of interest.

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Table 6. Analysis of the participants’ achievement completion (Pearson’s Chi-Square test).

| Achievement | Samples | Implicit total | Explicit total | Significance (p, approximate) |
|-------------|---------|----------------|----------------|-------------------------------|
| Overall     |         |                |                |                               |
| #1          | 45      | 44.0%          | 55.0%          | .463                          |
| #2          | 45      | 68.0%          | 80.0%          | .366                          |
| #3          | 45      | 28.0%          | 30.0%          | .883                          |
| #4          | 45      | 24.0%          | 45.0%          | .138                          |
| #5          | 45      | 0.0%           | 0.0%           | Invalid                       |
| Inexperienced|       |                |                |                               |
| #1          | 7       | 25.0%          | 33.3%          | .809                          |
| #2          | 7       | 50.0%          | 100.0%         | .147                          |
| #3          | 7       | 25.0%          | 33.3%          | .809                          |
| #4          | 7       | 25.0%          | 0.0%           | .350                          |
| #5          | 7       | 0.0%           | 0.0%           | Invalid                       |
| Medium      |         |                |                |                               |
| #1          | 28      | 37.5%          | 58.3%          | .274                          |
| #2          | 28      | 68.8%          | 75.0%          | .717                          |
| #3          | 28      | 12.5%          | 33.3%          | .184                          |
| #4          | 28      | 18.8%          | 58.3%          | .031*                         |
| #5          | 28      | 0.0%           | 0.0%           | Invalid                       |
| Experienced |         |                |                |                               |
| #1          | 10      | 80.0%          | 60.0%          | .490                          |
| #2          | 10      | 80.0%          | 80.0%          | 1.000                         |
| #3          | 10      | 80.0%          | 20.0%          | .058                          |
| #4          | 10      | 40.0%          | 40.0%          | 1.000                         |
| #5          | 10      | 0.0%           | 0.0%           | Invalid                       |

* Correlation significant at p < .05 (two-sided).
Additional information

No additional information is available for this paper.

Appendix

Player Questionnaire for Little Red Riding Hood: The End of Loop

This is the original design of the English questionnaire. Considering that all participants were native Chinese speakers, the delivered version was translated into Chinese. An inconsistency was found in the translation, where the question for rating tutorial boredom used the Chinese was translated into Chinese. An inconsistency was found in the translation, where the question for rating tutorial boredom used the Chinese word meaning ‘interesting’. This inconsistency has been fixed when analyzing the statistics.

Demographics information

1. Your game version:
   a. Explicit version
   b. Implicit version
2. Gender:
   a. Male
   b. Female
3. Age:
   a. Under 10
   b. 10–15
   c. 15–20
   d. 20–25
   e. 25–30
   f. 30–35
   g. 35–40
   h. 40–50
   i. More than 50 years old
4. Are you a student or staff member of Xi’an Jiaotong-Liverpool University (XJTLU)?
   a. Yes
   b. No
5. Please evaluate your level of mobile gaming abilities:
   a. My gaming ability is not good. (Inexperienced)
   b. I like playing mobile games but am not proficient. (Medium)
   c. I am skilled with mobile games. (Experienced)
   d. Other levels
6. Have you played and understood the following games (more than one answer can be selected)?
   a. Ninja Must Die 3 (Renzhe Bixu Si 3)
   b. Parkour Everyday (Tiantian Kupao)
   c. Super Mario Bros.

Game Review—Non-Tutorial

7. Please rate the playability of Little Red Riding Hood: The End of Loop: (A number between 0-100 can be selected)
8. Please rate the difficulty of Little Red Riding Hood: The End of Loop: (A number between 0-100 can be selected)
9. Please rate your enjoyment playing Little Red Riding Hood: The End of Loop: (A number between 0-100 can be selected)
10. Please copy your achievement code for your first five plays. (A computer-generated code will be put here. Players can access the code in the game)

Game Review—Tutorial and Comments

11. Do you agree that the tutorial conveyed the gameplay effectively and helped you understand this game?
   a. Strongly disagree
   b. Neither disagree nor agree
   c. Neither disagree nor agree
   d. Agree
   e. Strongly agree
12. Do you agree that the tutorial is boring?
   a. Strongly disagree
   b. Disagree
   c. Neither disagree nor agree
   d. Agree
   e. Strongly agree
13. Please give a general comment on this game.
   (The player can write their comments here).

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