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節慶遊戲化：量表建構與模式驗證

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計畫主持人：劉瓊如

計畫參與人員：陳善珮、蔡念祈、陳瑜昕

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Festival Gamification: Conceptualization and Scale Development

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中文摘要

基於自我決定理論，本研究建立了節慶遊戲化量表（FGS）。透過多次研究方式，在研究一中，經由文獻綜述對五個 FGS 構念進行了分類，然後進行了十二位專家學者深度訪談。從訪談中擷取了 296 個項目，後來獲得六個構念縮小到 33 個項目；在研究二中，調查自行車節（Mt Wuling Cycling）收集 226 份遊客問卷，用於探索性因素分析，得到五個構念 20 個項目。在研究三中，調查馬拉松節（Taiwan's Rice Heaven-Tianzhong Marathon）收集 253 份遊客問卷進行驗證性因素分析，最終得出五個構念 16 個項目。然後，進行相關效度檢定證實這五個構念對心流體驗有正向的影響。在研究四中，為了檢查所建立的五構念 16 個項目 FGS 的模型擴展，運用宗教節慶（Dajia Mazu Pilgrimage）的 219 份遊客調查問卷進行交叉驗證分析。

關鍵字：自我決定理論，節慶遊戲化，心流體驗

Abstract

Based on self-determination theory, this study developed a Festival Gamification Scale (FGS). Through multi-study method, in study one, five FGS dimensions were sorted through literature review, followed by twelve in-depth interviews. A total of 296 statements were extracted from interviews and were later narrowed down to 33 items under six dimensions. In study two, 226 survey responses were collected from a cycling festival (Mt Wuling Cycling) for exploratory factor analysis, resulting in twenty items under five dimensions. In study three, 253 survey responses were obtained from a marathon festival (Taiwan's Rice Heaven-Tianzhong Marathon) for confirmatory factor analysis, resulting in the final sixteen items under five dimensions. Then, results of criterion-related validity confirmed positive effects of these five dimensions on flow experience. In study four, for examining model extension of the developed five-dimensional 16-item FGS, cross-validation analysis was performed using 219 survey responses from a religious festival (Dajia Mazu Pilgrimage).

Keywords: festival gamification; flow experience; self-determination theory

1. Introduction

Seaborn and Fels (2015) explained that gamification is utilizing game design elements and game mechanisms in non-game situations and pointed out that applying gamification in non-game situations could change human behavior. Xu, Weber, and Buhalis (2014) also pointed out that gamification could stimulate tourists' participation in activities and enrich their tourism experiences. In Taiwan, the concept of gamification has recently been highly emphasized in tourism policies and tourism marketing. To internationally promote incentive travel in Taiwan, the Taiwan External Trade Development Council utilized the concept of gamification and started an annual marketing campaign in 2014 called "Asia Super Team." Through interactive online and live competitions in Taiwan, companies in other Asian countries can join this campaign for the chance to win an incentive travel package to Taiwan (TAITRA, 2017). This gamified marketing campaign has successfully attracted participation from many Asian companies, such as BUN Corporation from Japan in 2017, Pathum Thani Brewery from Thailand in 2016, Above Creative Events from Malaysia in 2015, and Seng Hua Hng Foodstuff from Singapore in 2014.

Moreover, in 2016 the Tainan city government, located in southern Taiwan, cooperated with Ingress, a world famous mobile game, to host a festival called "Ingress Mission Day in Tainan" for tourists to visit tourist attractions in Tainan City through the mobile game (Ingress, 2016). The festival was held by planning twelve missions located in different districts in Tainan City. Each mission was surrounded by six or more tourist attractions. Using smartphones as tools to occupy landmarks of Tainan City, tourists participated in this festival as players of Ingress, walking through the whole city to pass missions and enjoying cooperation with other players. Through involving gamification in tourism, tourists gained motivation to visit Tainan city and had fun.

Festival is a common form of cultural celebration (Getz, 2005). Festival tourism offers themed environments for tourists to collectively enjoy (William, 1997) and utilizes features such as ritual or ceremony, special ambience and service, high levels of personal contact and interaction, and crowd (Shone & Parry, 2001). Like the current trend of co-creation in the service industry (Vargo & Lusch, 2008), festival tourism also aims to co-create experiences with tourists. To improve experiences at festivals, the effectiveness of gamification on enhancing participation and perceived value (Huotari & Hamari, 2012) should be applied when planning the festivals.

Players' interactions and loyal intentions toward an activity could be strengthened through game design (Crawford, 2011), revealing the feasibility for involving gamification in festivals.

Although gamification has been concerned and applied in the tourism industry, limited literature could be found in tourism academy (Xu, Buhalis, & Weber, 2017; Xu, Tian, Buhalis, Weber, & Zhang, 2016). Therefore, to contribute knowledge in festival gamification, it becomes essential to start by establishing a Festival Gamification Scale (FGS).

This study defines festival gamification as the extent of a festival to involve game elements and game mechanisms. Gamification motivates humans to experience a physiological process that guides their persistent playing behavior toward a gamified event (Moos & Marroquin, 2010). Tourists' engagement in festival gamification could be supported by self-determination theory (SDT), which explains self-determined and self-motivated functions in motivation (Ryan & Deci, 2002). Self-determination theory emphasizes the importance of human inner competence on personality development and self-control of behaviors (Ryan, Kuhl, & Deci, 1997). Self-determination theory explains human mental growth and psychological needs as foundations for self-motivation (Ryan & Deci, 2000). In terms of what motivates people to engage in tasks, according to SDT, competence, autonomy, and relatedness are three psychological needs that drive human inner motivation (Ryan & Deci, 2000). Deci and Ryan (1980) pointed out that intrinsic motivation could sustain people's engagement in tasks more than extrinsic motivation. Therefore, this study conceptualizes festival gamification through both the intrinsic motivation of SDT and the three psychological needs.

For the three psychological needs of SDT, competence refers to people's subjective confidence about their capability to overcome tasks and challenges (Covington, 2000), autonomy represents the awareness of using actions to demonstrate personal interests and integrated values (Deci & Ryan, 1985; Ryan, 1993), and relatedness involves meaningful connections and relationships with others (Deci & Ryan, 2002). For the intrinsic motivation of SDT, Deci and Ryan (1985) argued that intrinsic motivation drives people to actively work on something because they have fun about doing the work. Therefore, to attract players' attention and motivate them to play, it is important to involve fun elements in game design (Lazzaro, 2004; Zichermann & Linder, 2010). Driven by intrinsic motivation in playing games, players could gain mastery based on accumulated playing experiences. The process of gaining senses of mastery could

sustain players' interest to play (Koster, 2013) because players may consider mastery as a type of mental reward and achievement for playing games (Zichermann & Linder, 2010). Based on SDT, competence, autonomy, relatedness, fun, and mastery are the five key elements that form the concept of festival gamification.

Former studies in festival tourism mainly focus on issues of tourists' motivations (Lee, Arcodia, Lee, 2012; Lee, Lee, & Wicks, 2004), ego-involvement (Havitz & Dimanche, 1999; Ryan & Lockyer, 2002), satisfaction, and revisit intention (Lee, Kyle, & Scott, 2012; Lee, Lee, & Choi, 2011; Wan & Chan, 2013), lacking discussions and understanding of gamification in festivals. Hence, the purpose of this study is to develop a Festival Gamification Scale (FGS). The development of FGS could provide valuable theoretical and practical contributions. For theoretical contributions, the conceptualization of FGS could contribute knowledge to the issue of festival gamification, and the FGS could serve as an important research tool for future studies. For practical contributions, the development of FGS could assist festival management organizations understand the content of festival gamification, and then utilize FGS on improving planning, management, and marketing of festivals.

2. Literature review

2.1 Game and gamification

People use games to escape from daily tasks and gain pleasure (Robson et al., 2015). Avedon and Sutton-Smith (1971) defined games as voluntary activities controlled by regulations, which require equal competitive actions and may results in different results. Salenand and Zimmerman (2004) argued games as simulated competitions that allow players to play under regulations and generate numerable results. McGonigal (2011) proposed four basic elements of games: goal, rule, feedback system, and voluntary participation. Game design enables players to achieve goals while agreeing to follow game rules, and could be designed with a reward system to inform players (McGonigal, 2011; Salenand & Zimmerman, 2004). Although badges, levels and rewards are not necessary elements of game design, these elements could strengthen players' engagement (McGonigal, 2011).

Bunchball (2010) stated that game mechanics include points, challenge, levels, virtual goods, and classification table. First, points can be used to monitor playing behavior, count

scores, and provide feedback (Zichermann & Linder, 2010), stimulating players' continuous participation (Seixas et al., 2015). Second, challenge involves gaining experience through completing tasks in a game. Rewards such as badges or moving to an advanced level are offered to increase players' senses of accomplishment and to provide chances for players to show off. Third, levels are planned in a game as an organized structure to demonstrate players' positions in a game based on their achievements and experiences (Zichermann & Linder, 2010). Players are motivated to keep entering and playing a game in order to obtain the symbolic value of levels (Bunchball, 2010). Fourth, virtual goods are intangible items existing in a game. Players normally can exchange points for virtual goods, and therefore have the desire to earn more points. Fifth, a classification table is a ranking of game players based on their earned points. Being listed in a classification table is a strong incentive for players' game engagement (Bunchball, 2010), but the difficulty to get listed in the classification table may also reduce low performers' play motivation (Zichermann & Linder, 2010).

Gamification is defined as the use of game elements and concepts in non-game situations (Seaborn & Fels, 2015; Zichermann & Cunningham, 2011). Different from games that are created for fun and leisure purposes, gamification could be utilized to motivate people's engagement in non-game situations and to improve the whole engagement experience (Robson et al., 2015; Rodrigues, Oliveira, & Costa, 2016; Seixas et al., 2015). The effectiveness of gamification has attracted applications and explorations in several fields. In education, studies found gamification could improve students' learning motivation and perceived enjoyment in learning (Fitz-Walter, Johnson, Wyeth, Tjondronegoro, & Scott-Parker, 2017). In management, gamification has proved helpful in improving employees' task performance and goal commitment (Landers, Bauer, & Callan, 2017). In marketing, Harwood and Garry (2015) proposed a model of a gamified customer engagement experience, explaining the effects of gamification on positively changing customer behaviors (such as social exchange), emotions (such as fun and satisfaction), and outcomes of customer engagement (such as loyalty and relationship).

In tourism, Negrușă, Toader, Sofică, Tutunea, and Rus (2015) suggested applications of gamification in sustainable tourism in three areas: (1) developing relationships with tourists, (2) strengthening human resource management for tourism sectors (3) sustaining community support

for tourism Through focus groups, Xu et al. (2016) proposed tourists' motivation to play tourism games consisted by curiosity, explore the destination, socialize, fun and fantasy experiences, and challenge and achievement. Xu et al. (2017) further pointed out benefits of using gamification in tourism marketing as: raising brand awareness, enhancing tourist experiences, increasing engagement, improving customer loyalty, providing entertainment, and streamlining employee management. The above literature reveal the potential for utilizing gamification in festival tourism to enrich tourists' festival experiences and motivate their festival participation. Focusing on festival tourism, this study addresses the role of gamification in festivals, especially on conceptualizing the concept of festival gamification and developing the measurement of FGS.

2.2 Self-determination theory (SDT) and gamification

Xu et al. (2014) pointed out that, through satisfying players' psychological needs of competence, autonomy, and relatedness in game design, players could perceive the meaning of play and become active on continuous play. In game design, in addition to utilizing the mechanism of extrinsic motivation by reward systems and badges, it is important to sustain players' active long-term engagement through stimulating their intrinsic motivation (Ryan & Deci, 2000; Deterding et al., 2011). Hence, according to SDT, this study focuses on both psychological needs and intrinsic motivation to conceptualize gamification.

2.2.1 Psychological needs

One of the assumptions of SDT is that people have the natural tendency to connect with personal inner feelings, other individuals, and social groups (Ryan & Deci, 2002). When individuals perceive the connection between an action with private concerns or values, they are more willing to automatically engage in the action (Vansteenkiste et al., 2006), revealing the importance of considering tourists' private psychological needs and understanding how to engage them through gamification.

Competence is defined as the capability to take actions based on integrating skills and knowledge in special situations (Hansen, 1997). Lasnier (2000) added competence is the concept of know-how-to-act, which requires the ability to integrate both cognitive and affective skills. Following the key words of know-how-to-act and the integration of Lasnier (2000), competence not only covers "know how" but also includes "know how to be" (Esfandiari, Seporaa, & Mahadia, 2015). Competence is achieved through the integration of multiple skills, and

knowledge (Albir, 2007). Sometimes, people gain senses of competence through perceiving chances to show their competence in front of others (Harter, 1985). Covington (2000) argued that competence guides individuals to seek personal challenges, enables personal persistence, and plays an important role in building a personal value system. To satisfy the need for competence and obtain confidence, people seek challenges that match with or improve their own abilities (Ryan & Deci, 2002).

Autonomy represents the free willingness for people to decide and select their own actions (Deci & Ryan, 1985). Dworkin (1988) pointed out that autonomy drives people to be independent and desire certain values or emotions. People perceive the increase of autonomy on an action when they become interested and gain the chance to freely and/or independently do the action (Deci & Ryan, 1985; Ryan, 1993). That is, with autonomy, people free to show long-term engagement for interested tasks because they have freedom to independently decide their behaviors. Additionally, people's demand for autonomy is related to their personal interest and value system; even though some actions might be influenced by external factors, as long as individuals are working on their own decided actions with autonomy, they could still feel that they are actualizing their own interests and value system (Ryan & Deci, 2002).

Relatedness means people's expectations for having feelings of safety and acceptance in social settings (Ryan, 1995). In SDT, Deci and Ryan (2000) argued relatedness exists in interactive environments where individuals can freely express personal feelings without others' judgments, or even receive friendly feedback from others. People feel a sense of relatedness when they have connections with others, care or are cared for by others, or identify with social groups (Ryan, 1995). Relatedness could be built by warm feelings in social relations and close emotional connections with others (King, 2015). To enjoy the warm and emotional benefits from relatedness, people could be driven to work on social actions (Walton et al., 2012).

2.2.2 Intrinsic motivation

Both the amount and type of motivation influence human behavior in work and game play (Ryan & Deci, 2000). Deci and Ryan (1985) proposed two types of motivation: (1) intrinsic motivation, which refers to people's intention to automatically work on something simply because of fun or interest; and (2) extrinsic motivation, which refers to actions driven by some external factors, such as rewards, the expectations of others, or social stress (Zichermann &

Cunningham, 2011). Dale (2014) explained that people could become unwilling to work on something if they are always motivated to do it purely by rewards. If the external motivation, rewards, is missing from game design, players might easily lose their motivation to play (Cruz, Hanus, & Fox, 2015; Deci, Koestner, & Ryan, 1999).

Dale (2014) explained that intrinsic motivation is driven by intrinsic rewards, which include recognition, personal achievement, responsibility, power, fun, and mastery. Adding intrinsic rewards in game design could motivate players to take game challenges and gain senses of achievement through playing experiences (Hamari & Eranti, 2011). During game challenges, players may need to cooperate with other players, gain social interaction through playing, perceive deep participation and recognition in the game by the social group, and be aware of personal responsibility and mutual trust in the game playing group (Sailer et al., 2013). Additionally, adding fun elements in game increases the motivation to play (Lazzaro, 2004; Zichermann & Linder, 2010). Mastery in a game is also an important intrinsic reward because players view mastery as a record for their achievement and they are proud of being in the senior level among all players of the game (Zichermann & Linder, 2010).

Based on SDT, both intrinsic and extrinsic motivations could cause changes in human behaviors (Ryan & Deci, 2000). Deci and Ryan (1980) argued that intrinsic motivation could sustain people's long-term engagements better than extrinsic motivation because people feel "they want to" rather than "they need to" under intrinsic motivation. Some studies also found that, although external game rewards such as points or badges could motivate players to play a game, creating target players' intrinsic rewards in game design is the key to sustaining long-term play (Ryan et al., 2006). For the purpose of sustaining tourists' long-term participation in festivals, players' intrinsic motivation should be emphasized. Therefore, this study involves the concept of intrinsic motivation from SDT into conceptualizing FGS.

2.3 Dimensions of FGS

Based on three psychological needs and two elements of intrinsic motivation in SDT (Ryan, Kuhl, & Deci, 1997), this study extracted five dimensions for FGS: competence, autonomy, relatedness, mastery, and fun. Each dimension is explained as follows:

2.3.1 Competence

The concept of competence comes from Deci and Ryan (2002) about the feelings for people

to present personal competence. This study defines competence in FGS as festival tourists' feelings about how much they could present their ability to achieve personal goals in a festival. For example, tourists at a marathon festival may feel high in competence when achieving the goal of a 10K run. Players normally intend to achieve game goals through their own competence (Xu et al., 2014). To enhance players' perceived competence in game play, Xu et al. (2014) suggested that goals in game design should be clear, feasible, and attainable. Sometimes, big challenges could be separated into small gates allowing players to gradually achieve goals (Groh, 2012). Positive feedback or reward systems are important for encouraging players' continuous play (Xu et al., 2014). To improve players' perceived competence, Groh (2012) proposed the concept of juicy feedback, and explained that "juicy" means the feedback should be made fresh and made by various approaches. Based on received juicy feedback, players could feel from various moments in playing experiences that they are capable of continuing a game. In festival gamification, festival experiences should be designed with challenges and reward systems for tourists to attain competence.

2.3.2 Autonomy

The concept of autonomy comes from Deci and Ryan (1980) about individuals' willingness to work on something and have the right to make decisions. This study defines autonomy in FGS as festival tourists' perceived flexibility for types and depths of participation in a festival. For example, tourists at a cosplay festival could enjoy a sense of autonomy when they freely decide what to dress up as for the festival and how to interact with other tourists at the festival. Autonomy in game design implies the feasibility for players to freely decide when to enter or exit a game (Xu et al., 2014). To improve perceived autonomy, game design could offer flexible options for mission completion or add dynamic reward systems to positively encourage different types of play actions (Ryan, Rigby, & Przybylski, 2006). It is important to notice that players may lose intention to play once they feel lack of autonomy due to being controlled by fixed game systems (Deterding et al., 2011; McGonigal, 2011). Based on the above, to involve gamification in festivals, flexibility in participation and dynamic reward systems should be designed for tourists to perceive autonomy.

2.3.3 Relatedness

The concept of relatedness comes from Akbari et al. (2015) about the feelings to be needed

by others and belong to a social group. This study defines relatedness in FGS as festival tourists' feelings about how they connect or interact with other tourists in a festival. For example, tourists at a music festival may share their passion for a musician with other tourists nearby, and these tourists may become good friends through the music festival. Xu et al. (2014) argued the importance of relatedness in gaming exists in the cooperation with other players to complete game challenges or experience sharing through social networking with other players. Through relatedness, players become connected to each other and enjoy a sense of community. The social groups established in a game could sustain mutual support on continuous play (McGonigal, 2011). McGonigal (2011) mentioned that social connection in a game could also improve players' subjective well-being through a sense of belongingness. Taken together, to enhance gamification in festivals, tourists' feelings of relatedness should be considered in festival planning, making tourists feel they are part of the community.

2.3.4 Mastery

The concept of mastery comes from Pearlin and Schooler (1978) referring to individuals' senses of having control over progress in situations, abilities, and life events. This study defines mastery in FGS as festival tourists' feelings about the progression of their abilities, skills, and knowledge during a festival. For example, tourists at a wine festival may perceive high in mastery when attending sessions of wine testing and gaining knowledge of wine from the festival. Zichermann and Linder (2010) called the concept of mastery as progression to maturity, meaning the importance to emphasize the progress of advancement. To assist players in achieving mastery, games should be designed with different levels of difficulty for players to gradually gain skills and confidence through achievements and rewards (Koster, 2013). For players, mastery itself could be considered a mental reward which motivates them to achieve advancements through passing levels in a game (Zichermann & Linder, 2010). Following former findings of the usefulness of mastery in game design (Koster, 2013; Zichermann & Linder, 2010), festivals could be planned with a series of attractive activities for tourists to participate in and subsequently experience the positive feelings of mastery. Dividing a difficult big challenge into small pieces and allowing tourists to gradually pass the final big challenge is helpful for gaining mastery in festivals.

2.3.5 Fun

The concept of fun refers to the feelings of enjoyment (Koster, 2013). This study defines fun in FGS as festival tourists' feelings about the extent of enjoyment in a festival. For example, tourists at a lantern festival may have fun because of the interesting design and the beauty of the lanterns. Lazzaro (2004) proposed four keys to creating fun in a game: hard fun, easy fun, altered states, and the people factor. First, hard fun refers to the opportunities for players to have fun by passing challenges in a game. To pass levels in a game, players sometimes need to utilize strategies and think creatively, thereby enjoying positive feeling from their achievements when getting advancements. Second, easy fun represents the pure pleasure gained in a game. Players could perceive easy fun from interesting designs or cute elements of a game, exploring funny or attractive game stories or content, or simply feeling relaxed when forgetting daily tasks during play. Third, altered states are functions of therapy from games that allow players to reduce negative emotions while increasing positive mental feelings. Fourth, the people factor strengthens fun in a game through enjoying friendship and cohesion, social interaction, or pursuing common goals through teamwork. Koster (2013) added that fun feelings of a game come from learning and suggested that game design should assure that players could keep getting chances to learn before exit the game because they always feel bored and uninterested when there are no new things to learn. Based on the above, festivals should be planned with the four keys and learning chances for tourists to have fun in the gamified festivals.

3. Developing the FGS

According to the guidelines suggested by Churchill (1979), the FGS was developed through a multi-study method, including steps for defining constructs, generating items, purifying measures, and assessing scale reliability and validity. The overall procedure for developing FGS includes four studies. In study one, items for FGS were generated by literature review and in-depth interviews. In study two, to measure purification, data was collected from a cycling festival, Mt Wuling Cycling, and analyzed by explorative factor analysis. In study three, to confirm the measures purified from study two, data was collected from a marathon festival, Taiwan's Rice Heaven-Tianzhong Marathon, and analyzed by confirmatory factor analysis. To check model extension, different from data collection from sport festivals in study two and three, data was collected from a religious festival, Dajia Mazu Pilgrimage, for cross-validation analysis

in study four.

3.1 Study 1: Item generation

Following Churchill (1979), this study explored dimensions of FGS through literature review, and then conducted in-depth interviews to generate items for FGS. Five dimensions for FGS emerged through literature review: competence, autonomy, relatedness, mastery, and fun. To systematically complete the understanding and content of FGS, in-depth interviews were then conducted to extract items. The number of interviewees was decided by information saturation, which exists when there is no new information regarding the same questions by adding one more interviewee. A total of twelve interviewees (age, 30-75 years) participated in this study. Four of them were experts in festivals and tourism, and eight were frequent festival tourists with festival experiences at Dajia Mazu Pilgrimage, Taiwan's Rice Heaven-Tianzhong Marathon, Taipei Marathon, Mt Wuling Cycling, Ingress Mission Day In Tainan, and Asia Super Team. Table 1 shows profiles of these twelve interviewees, consisting of five males and seven females. Two had high school degrees, four had bachelor degrees, and six had graduate degrees. The length of the interviews ranged from 50 minutes to 90 minutes. After the in-depth interview with the twelfth interviewee, no new information was found compared to the former eleven interviews, representing information saturation of the information collection.

Table 1. Interviewees' profile

No.	Institution	Position	Gender	Age	Education	Tenure ¹	Length ²
1	Department of Tourism and Leisure, Hsing Wu University	Assistant Professor	Female	55	Ph.D.	5	60
2	Chiayi County Government	Consultant	Male	75	Master	45	75
3	Tourism Bureau, Republic of China (Taiwan)	Technical Specialist	Female	43	Bachelor	18	75
4	Chinese Taipei Road Running Association	Consultant	Male	60	Master	35	80
5	Tourism Bureau of Tainan City Government	Division Chief	Female	43	Master	22	75
6	Taiwan External Trade Development Council	Section Chief	Female	49	Master	23	60
7	Section of Agricultural Extension, Sikou Township	Advisor of Home Economics	Female	62	High school	27	75

8	NA	Housewife	Female	47	High school	0	50
9	Freelance	NA	Male	32	Bachelor	2	60
10	Administration of Alishan National Scenic Area	Administrative assistant	Female	39	Bachelor	15	60
11	TH Industries	Business Specialist	Male	30	Bachelor	3	75
12	Siang Lin Elementary School	Teacher	Male	39	Master	14	90

Note: ¹ Length of job tenure is measured by years

² Length of each interview is measured by minutes

Each dimension of FGS was defined by literature review before in-depth interviews. In the beginning of in-depth interviews, interviewees read definitions of these five dimensions (competence, autonomy, relatedness, mastery, and fun) and the definition of festival gamification. Then, each participant answered open-ended questions regarding their festival experiences of each dimension. These open-ended questions included: (1) based on your personal festival experiences, please share how you perceive “competence” at festivals; (2) based on your personal festival experiences, please share how you perceive “autonomy” at festivals; (3) based on your personal festival experiences, please share how you perceive “relatedness” at festivals ; (4) based on your personal festival experiences, please share how you perceive “mastery” at festivals ; (5) based on your personal festival experiences, please share how you perceive “fun” at festivals; and, (6) based on your personal festival experiences, please share how you perceive festival gamification, especially the experiences not covered in the above five dimensions. To collect rich experience sharing, interviewees were encouraged to give examples from their visited festivals to answer these questions.

All the interviews were recorded by a recording pen and transcribed into transcripts. Recorded responses were systematically categorized by content analysis (Kassarjian, 1977). One event researcher and one expert in content analysis worked as assessors and coded the transcripts independently into 296 statements. These two assessors read and classified items iteratively, reaching agreement of 279 statements. The 279 statements were then narrowed down by assessors into 33 statements under six dimensions. Inter-assessor reliability of these two assessors exceeded 0.90, showing high content validity in this classification (Davis & Cosenza, 1993). The results of this content analysis and sample statements for each item. The code is named by “number of the interviewee-number of the sorted dimension-number of sorted item of

the dimension.” For example, A1-3-2 is a coded statement sorted into the second item of the third dimension from the first interviewee. Number of coded statements ranged from 37 to 79 in each dimension, and the number of coded statements ranged from 5 to 11 in each item.

Through in-depth interviews, this study found one new dimension for FGS, narratives. Different types of festivals were used by interviewees to share statements about narratives. This study defines narratives in FGS as: the level of narrative sense in a festival. Narratives is very helpful in human reasoning, enabling people to attach meaning with their experiences, frame thought, and guide actions (Bruner, 1990; Polkinghorne, 1988). The function of game narratives is to create stories about characters and plots under the time sequence of beginning, middle, and end (Lu, 2015). Through narrative game scenarios, players can get involved in the game and be guided to obtain and practice related game skills (Malone, 1981). The concept of narratives is commonly used by storytellers or writers to attract audiences and readers to get immersed into the relationships among characters, events, and situations (Moyer-Gusé, 2008; Slater, 2002). Additionally, narratives have been utilized to improve comprehension in information communication (Laurillard, 1998) as well as serving as a means of navigation in multi-media environments (McLellan, 1993).

Finally, 33 statements for FGS were identified and categorized into six dimensions, including four statements for competence, five statements for autonomy, five statements for relatedness, six statements for mastery, eight statements for fun, and five statements for narratives.

3.2 Study 2: Purification of measures

The 33 items generated from study 1 were turned into a survey questionnaire and were rated by a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Through convenience sampling, the survey questionnaire was distributed at a cycling festival, 2016 Mt Wuling Cycling, in Taiwan. A total of 226 valid responses were collected. The subjects to item ratio was 6.85:1, passing the criteria of 5:1 suggested by Gorsuch (1974).

In data analysis, item-to-total correlations were analyzed for the 33 items, passing the criteria of 0.30 (Churchill, 1979). Exploratory factor analysis (EFA) with a component analysis and orthogonal varimax method was then conducted. Based on eigenvalue and scree plot to identify numbers of factors, this study found five factors for FGS (Hair, Black, Babin,

&Anderson, 2010). To purify measures, items were deleted if their eigenvalue were lower than one or if they had factor loadings lower than 0.5 on one factor and higher than 0.3 on other factors. Based on these criteria, 13 items were deleted. To ensure the data had sufficient inherent correlations to run EFA, Kaiser-Meyer-Olkin (KMO) and Bartlett test of sphericity were analyzed. The KMO index was 0.872, and Bartlett's test of sphericity was significant at the level of 0.001, justifying the use of EFA. The scree plot showed that a 20-item five-factor solution (competence, relatedness, mastery, fun, and narratives) was the optimal solution. The combined factor loadings accounted for 64.66% of the total variance. Table2 shows the EFA results of the 20-item FGS.

Table 2. Results of EFA (cycling festival, n = 226)

Items	Mean	Factor loading	Variance (%)	Cronbach's α
Factor 1: Relatedness			34.36	.87
X13 I like that the host provided an opportunity for participants to interact and socialize.	3.81	0.80		
X 14 I like the interaction with other participants in this activity.	3.79	0.79		
X 10 I had a chance to meet others who participated.	3.83	0.74		
X 11 I enjoyed completing this activity with other participants.	3.90	0.74		
X 12 It was comfortable for me to participate in this activity with others.	3.86	0.65		
Factor 2: Mastery			9.77	.83
X 19 I was constantly encouraged by the accumulated experiences throughout my participation to continue and complete this activity.	3.96	0.77		
X 21 I feel I could explore new things through this activity.	4.01	0.75		
X 17 There were some challenges to overcome in the participation of this activity.	4.02	0.74		
X 22 I feel the process of participating in this activity could bring me an abundant sensory experience.	4.02	0.67		
X 20 Through the completion of each phase of this activity, I feel there was a gradual improvement of my relevant abilities.	3.93	0.67		
Factor 3: Competence			8.24	.74
X 4 I feel my physical strength is ok for this activity.	3.86	0.87		
X 3 I am capable of participating in this activity.	4.03	0.87		
X 2 I feel I could do well regarding the content in this activity.	3.80	0.56		
X 5 I can choose the content of the activity according to my own interest.	4.08	0.55		

Factor 4: Fun			6.71	.76
X 24 I feel there was perceivable creative ingenuity in the design of this activity.	3.56	0.85		
X 23 I feel the process of experiencing and participating in this activity could stimulate my own imagination.	3.63	0.73		
X 25 I feel this activity could stimulate my curiosity.	3.66	0.63		
Factor 5: Narratives			5.58	.73
X 31 I understand the relevant stories of this activity.	3.50	0.79		
X 29 I was interested in the origin of this activity from the beginning.	3.76	0.75		
X 30 I like relevant stories or reports of this activity.	3.67	0.69		

3.3 Study 3: Re-purification of measures

3.3.1 Confirmatory factor analysis

Study 3 aims to re-evaluate the factor structure of FGS using confirmatory factor analysis (CFA), and examine its criterion-related validity. The CFA model is a first-order five-factor oblique model. Using a survey questionnaire with the 20-item FGS developed from study 2, data for CFA was collected by onsite convenience sampling from a marathon festival, 2016 Taiwan's Rice Heaven-Tianzhong Marathon. A total of 253 valid responses were received from the marathon festival and the subjects to item ratio was 12.65:1, passing the criterion of 5:1 for sample size by Gorsuch (1974).

Using LISREL 8.80, the CFA was performed with maximum-likelihood. Four low-loading items in CFA were removed, resulting in sixteen items under five dimensions. Then, the five-dimensional 16-item FGS showed high fit indices ($\chi^2=149.73$, $df=94$, $p<0.05$, $\chi^2/df=1.59$, GFI=0.93, SRMR=0.05, RMSEA=0.05, NFI=0.95, NNFI=0.98, CFI=0.98, and AGFI=0.90) in CFA. Table 3 shows the results of CFA. All sixteen items were significant ($p<0.01$) with factor loadings ranging from 0.59 to 0.90, all factor loadings are higher than 0.45, t-values of factor loading were significant ($p<0.01$) in all items, all factors' composite reliabilities exceeded 0.7, and all factors' average variance extracted exceeded 0.5. Table 4 shows that the coefficients for correlations between pairs of factors were lower than .85 and lower than the squared root of AVE of each factor, proving adequate discriminant validity (Fornell & Larcker, 1981; Hung & Petrick, 2010). All factors' composite reliability (CR) ranged from 0.76 to 0.80, showing adequate internal consistency (Hair et al., 2010). Results shown above confirmed reliability and validity of the five-dimensional sixteen-item FGS (Bagozzi & Yi, 1988).

Table 3. Results of CFA (marathon festival, n = 253)

Items	Mean	Factor loading	t-value of factor loading	Construct reliability	Average variances extracted
Factor 1: Relatedness				0.78	0.55
X 12 It was comfortable for me to participate in this activity with others.	3.96	0.60	9.32		
X 13 I like that the host provided an opportunity for participants to interact and socialize.	3.91	0.75	14.38		
X 14 I like the interaction with other participants in this activity.	3.95	0.85	10.05		
Factor 2: Mastery				0.80	.50
X 19 I was constantly encouraged by the accumulated experiences throughout my participation to continue and complete this activity.	3.98	0.68	9.52		
X 20 Through the completion of each phase of this activity, I feel there was a gradual improvement of my relevant abilities.	3.98	0.64	12.48		
X 21 I feel I could explore new things through this activity.	4.00	0.75	14.55		
X 22 I feel the process of participating in this activity could bring me an abundant sensory experience.	4.04	0.75	11.32		
Factor 3: Competence				0.76	0.52
X 2 I feel I could do well regarding the content in this activity.	3.77	0.59	10.33		
X 3 I am capable of participating in this activity.	3.95	0.90	12.76		
X 4 I feel my physical strength is ok for this activity.	3.81	0.64	12.76		
Factor 4: Fun				0.77	0.53
X 23 I feel the process of experiencing and participating in this activity could stimulate my own imagination.	3.74	0.67	10.85		
X 24 I feel there was perceivable creative ingenuity in the design of this activity.	3.78	0.76	12.63		
X 25 I feel this activity could stimulate my curiosity.	3.73	0.75	12.34		
Factor 5: Narratives				0.79	0.56
X 29 I was interested in the origin of this activity from the beginning.	3.77	0.69	11.43		
X 30 I like relevant stories or reports of this activity.	3.83	0.83	14.28		
X 31 I understand the relevant stories of this activity.	3.62	0.72	12.09		

Table 4. Correlations and squared roots of AVE (marathon festival, n = 253)

	Factor1	Factor2	Factor3	Factor4	Factor5
Factor 1: Relatedness	<i>0.74</i>				
Factor 2: Mastery	0.59	<i>0.71</i>			
Factor 3: Competence	0.44	0.39	<i>0.72</i>		
Factor 4: Fun	0.52	0.55	0.32	<i>0.73</i>	
Factor 5: Narratives	0.43	0.50	0.46	0.60	<i>0.75</i>

Notes: 1. The diagonal elements are the squared root of the average variance extracted.

2. The off-diagonal elements are the correlations between the constructs ($p < 0.05$)

3.3.2 Dimensions of FGS and flow experience

The concept of flow experience was originally from Csikszentmihalyi (1975), referring to the optimal psychological status when individuals recognize something efficiently, deeply engage in something, have high motivation to do something, and/or gain high happiness through experiencing something. The flow experience is the integration of several senses, including having clear goals, gaining rewards, facing capable challenges, paying attention, trying to focus, controlling personal intentions and behaviors, losing self-awareness, forgetting time, and having goals for actions (Csikszentmihalyi, 1997). To assist players in gaining flow experience in playing games, game developers consider the pairing between players' skills and game challenges (Sweetser & Wyeth, 2005). Some games are designed for players enjoy flow experience through gradually offering small challenges toward long-term goals (Groh, 2012). Through passing small challenges, players mature game skills and receive game rewards, as well as enjoy flow experience in the playing process (Chen, 2007). Similarly, festivals that involve game design elements and game mechanisms should be able to significantly improve tourists' flow experience. Hence, dimensions of FGS are hypothesized to be positively related to flow experience.

3.3.3 Criterion-related validity

In section 3.3.2, this study argues the extent of gamification in a festival could improve tourists' perceived flow experience. To examine criterion-related validity of FGS, relationships between dimensions of FGS and flow experience were tested. A three-item scale revised from Han (1988) was used to measure flow experience. All the items were rated by a five-point Likert-

type rating scale ranging from (1) for “strongly disagree” to (5) for “strongly agree.” As shown in Table 5, all coefficients were significant at the 0.01 level, supporting criterion-related validity of FGS.

Table 5. Results of criterion-related validity (marathon festival, n = 253)

Factor	Flow experience
Factor 1: Relatedness	.53**
Factor 2: Mastery	.70**
Factor 3: Competence	.66**
Factor 4: Fun	.53**
Factor 5: Narratives	.58**

Note: ** Correlation coefficients are significant at the 0.01 level

3.4 Study 4: Model extension

Model extension is a cross-validation analysis to check replicability of FGS in different types of festivals. Since samples collected for both EFA and CFA were from sport festivals, for testing model extension, this study collected 219 valid survey samples through onsite convenience sampling with the sixteen-item FGS from 2016 Dajia Mazu Pilgrimage, a famous religious festival in Taiwan. The subjects to item ratio was 13.69:1 of the data from Dajia Mazu Pilgrimage, passing the criteria of 5:1 by Gorsuch (1974). Following multi-group analysis (Jöreskog & Sörbom, 1993), model extension was analyzed by comparing the data from Taiwan’s Rice Heaven-Tianzhong Marathon and the data from Dajia Mazu Pilgrimage. Table 6 shows the results of the cross-validation analysis, which covers strategies of loose replication, moderate replication, and tight replication (MacCallum et al., 1994). As listed in Table 6, contributions to the chi-square test for the validation sample were 40.44% in loose replication, 40.77% in moderate replication, and 43.95% in tight replication.

Findings of the loose replication confirmed that the same factor structure could be found in both the marathon festival (Taiwan’s Rice Heaven-Tianzhong Marathon) and the religious festival (Dajia Mazu Pilgrimage). The $\Delta\chi^2$ value between the loose replication and the moderate replication was 24.85 (with 16 *df*, $p > 0.05$), indicating samples from these two festivals were equivalent to the factor loadings. The $\Delta\chi^2$ value for these two models between the moderate replication and the tight replication was 99.30 (with 26 *df*, $p < 0.05$), proving inconsistency of measurement errors and construct-level metrics between these two samples. Additionally, the

lowest value of ECVI existed in the moderate replication model. Based on the above, factor loading matrix invariance existed in the FGS cross samples collected from the marathon festival and the religious festival (Cheung & Rensvold, 2002), confirming the extended FGS model had good external validity.

Table 6. Results of the cross-validation analysis

Strategy	Overall model fit		Contribution to chi-square		%
	MFF χ^2 (df)	WLS χ^2 (df)	ECVI	MFF χ^2 (df)	
Loose replication	369.37 (188)	366.74 (188)	1.14	149.39 (188)	40.44
Moderate replication	394.22(204)	391.18 (204)	1.12	160.73 (204)	40.77
	$\Delta\chi^2 = 24.85, \Delta df = 16, p > 0.05$			$\Delta\chi^2 = 11.34, \Delta df = 16, p > 0.05$	
Tight replication	493.52 (230)	526.02 (230)	1.30	216.89 (230)	43.95
	$\Delta\chi^2 = 99.30, \Delta df = 26, p < 0.05$			$\Delta\chi^2 = 56.16, \Delta df = 26, p < 0.05$	

Note: marathon festival, n=253; religious festival, n=219

4. Discussion

Based on SDT, this study conceptualized the concept and content of festival gamification, and developed a systematic and comprehensive set of items for FGS. Following the multi-study method of Churchill (1979), the scale development process was conducted through steps of item generation, purification of measures, re-purification of measures, and model extension. Finally, a five-dimensional 16-item FGS was developed, which includes dimensions of relatedness, mastery, competence, fun, and narratives. It is interesting to notice that although competence, autonomy, relatedness, mastery, and fun are the five dimensions extracted through literature review for FGS, during the scale development process, “autonomy” was deleted while “narratives” was added as one dimension of FGS.

4.1 Theoretical implications

This study contributes several valuable theoretical implications. First, this study enriches the knowledge of festival gamification by proposing the concept and items of FGS. The concept of gamification has been studied in education, (Fitz-Walter et al., 2017), management, (Landers et

al., 2017), marketing (Harwood & Garry, 2015), and tourism (Negruşa et al., 2015; Xu et al., 2014; Xu et al., 2016; Xu et al., 2017). However, limited literature could be found to propose measurement scales for gamification. To fulfill this knowledge gap, based on SDT, this study developed a multi-dimensional FGS with 16 items. The development of FGS advances studies in gamification from the use of gamification into non-game contexts into measuring the extent of gamification in a multi-dimensional approach. The application of FGS can not only be utilized in festivals, but also in other contexts such as educational activities, employee development programs, or marketing campaigns. For the tourism academy, the FGS could further be applied in other sub-fields such as destinations, theme parks, cruise trips, or resorts.

Second, this study highlights the importance of narratives as a dimension in FGS. “I understand the relevant stories of this activity,” “I was interested in the origin of this activity from the beginning,” and “I like relevant stories or reports of this activity” are three items under narratives in the FGS. Although the dimension of narratives was not extracted from literature review and SDT, findings of in-depth interviews revealed the key role of narratives in festival gamification. This finding confirmed former literature (Lu, 2015; Schneider, Lang, Shin, & Bradley, 2004) about the role of stories and narratives in game design. For festival tourism, narratives represent the history, legend, story, memory, and tradition that form reasons for the celebration of festivals (Getz, 2005). Hence, the dimension of narratives in FGS demonstrates a key role to represent the specific feature for gamification in festivals.

Third, the FGS developed in this study could serve as an important research tool for future studies. With the FGS, future studies are able to monitor the longitudinal changes of each FGS dimension, clarifying when and how tourists’ perceived festival gamification is formed. The FGS serves as a starting point for examining the mechanism of festival gamification in changing tourists’ attitudes and behaviors. Future studies could work on follow-up studies of FGS by testing outcomes of festival gamification or examining moderating effects of enhancing outcomes of festival gamification. On the other hand, although the FGS has been tested in cycling, marathon, and religious festivals, the research settings are all in Taiwan. Cultural differences of FGS is another further direction for contributing knowledge in festival gamification.

4.2 Practical implications

This study also contributes to several valuable practical implications. First, the FGS provides festival management organizations and festival planners with systematic and complete information about festival gamification. The FGS offers five dimensions with items for festival management organizations and festival planners to understand the content of festival gamification and the multi-dimensional direction for improving gamification at festivals. Moreover, the sample coded statements listed in Table 2 provide information on tourists' perspectives about how tourists experience each FGS item in their festival experiences. For festival performance assessment, this FGS could also be utilized in tourist surveys for evaluating the extent of gamification of a festival. Based on the results of the performance assessment by FGS, festival management organizations and festival planners could learn the relative scores among dimensions of FGS, and plan for future improvement of gamifying the festival.

Second, the FGS could be applied in positioning a gamified festival. Festival management organizations and festival planners could firstly consider the features and types of their festival, and then gamify their festival based on investing resources in key FGS dimensions. For example, marathon festivals might normally been experienced by tourists with high in mastery because they experience challenges in completing the run and improving their physical status. To distinguish themselves from other marathon festivals and position a gamified marathon festival, festival management organizations and festival planners could take a deeper look into other dimensions and items of the FGS. Maybe they could position the gamified marathon festival with the FGS dimension of fun and focus on encouraging tourists' to dress creatively for the run or engage innovative cheer groups from local communities. Or, maybe they could position the gamified marathon festival with the FGS dimension of relatedness, emphasizing the experience of supportive dynamic interactions while running through a smartphone app developed by the festival.

Third, the FGS can be applied in festival marketing for potential tourists to understand how a gamified festival could be experienced. Based on decisions of positioning and target tourists for a gamified festival, festival management organizations and festival planners could plan opportunities for tourists to experience feelings of gamification at the festival. For example, through setting up booths at tourism fairs, the facility of virtual reality could be used to show booth attendees how fun the gamified festival would be, how the sense of mastery could be

experienced through the process of participating the festival, or how other tourists in the festival will mutually interact and play to enhance potential tourists' expectations about relatedness of the gamified festival. By utilizing the FGS in festival marketing, festival management organizations and festival planners could gain the chance to shape potential tourists' expectations for gamified festivals and extend tourists' engagement with a gamified festival even before they attend it.

4.3 Limitations and suggestions for future research

Although this study has contributed to valuable implications, a few limitations are still worth considering. First, the FGS was established and tested by cross-sectional survey. Longitudinal changes of tourists' perceived festival gamification were not explored in this study. With FGS, future studies could explore the dynamic changes of tourists' ratings on the FGS before, during, and after a festival experience. Second, antecedents and outcomes of the FGS should be proposed and examined in future research. Focusing on the purpose of conceptualization and scale development for FGS, this study only tested flow experience as a stable outcome for dimensions of FGS. Future studies are encouraged to clarify the application of FGS on improving tourists' attitudes and behaviors, such as utilizing festival gamification to improve attitudes toward cultural conservation or on increase pro-environmental behaviors. Third, cultural differences in FGS should be analyzed to demonstrate the cross-cultural applicability of this FGS. This study used three festivals in Taiwan for data collection and scale testing. However, people in different cultures may think of and participate in gamification differently, resulting in potential issues of cultural differences in FGS for future research.

5. Conclusion

Based on SDT, this study defines festival gamification as the extent of a festival to involve game elements and game mechanisms. The major contribution of this study is to develop a five-dimensional 16-item FGS, including dimensions of relatedness, mastery, competence, fun, and narratives. Findings of the cross-validation analysis proved that the extended FGS model is stable and can be applied in both sport and religious festivals. The FGS enriches knowledge of gamification in the festival literature and provides a research tool for future studies to build knowledge in festival gamification. The FGS also contributes valuable information for festival management organizations to strategically plan, manage, and marketing festivals.

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