# The e-learning persuasion through gamification: an elaboration likelihood model perspective

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**Abstract**

**Purpose** – *The purpose of this theoretical paper is to introduce a conceptual model to investigate e-learning persuasion through gamification elements using the social psychology theory of elaboration likelihood model (ELM).*

**Design/methodology/approach** – *The author systematically reviewed several theoretical and empirical papers which applied the ELM in various settings. Based on the literature, the author identified six research prepositions which facilitate to investigate e-learning persuasion through gamification.*

**Findings** – *This study contributes to the existing literature by identifying an ELM-based conceptual model which can be used to empirically investigate the e-learning persuasion using gamification elements. Accordingly, the central route persuasion could be conducted through argument quality, demographic differences and technology context facilitated through gamification elements. The peripheral route persuasion could be conducted through variables such as source credibility, social presence and message content.*

**Practical implications** – *This study contributes important findings to the e-learning research by introducing a conceptual model–based on the social psychology theory of ELM. Thereby, this study introduces a method for the future researchers, to investigate the e-learning persuasion using gamification elements. Further, future researchers can use this model to investigate the e-learning persuasion through gamification in different contexts including primary, secondary and tertiary educational levels.*

**Originality/value** – *To the best of the author's knowledge, this study can be considered as the first theoretical paper which developed an ELM-based conceptual model to investigate the e-learning persuasion through gamification in education context.*

**Keywords** *E-learning, Persuasion, Gamification, Conceptual model, Elaboration likelihood model*

**Paper type** *Conceptual paper*

## 1. Introduction

Game-based delivery methods are used to challenge, engage and motivate individuals to offer effective learning compared to more traditional modes of awareness (Bassiouni and Hackley, 2016; Batat, 2020; Skinner *et al.*, 2018). In the 1970s, video games became an important source of entertainment for young people (Kirriemuir, 2002). These games can be played using a variety of devices such as handheld machines such as the Game Boy console and mobile phones (Mitchell and Savill-Smith, 2004). Many researchers have been working since past 20 years on video games for learning, and several reviews of the literature on educational games have been completed within the past few years (Aguilera and Mendiz, 2003; O'Neil *et al.*, 2005). While no clear causal relationship between gaming and academic performance has been seen (Emes, 1997), frequent players been identified as less positive towards school by many researchers (Colwell *et al.*, 1995; Emes, 1997; Mitchell and Savill-Smith, 2004; Roe and Muijs, 1998).

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Because of the addictive nature of the games (Chou and Ting, 2003; James *et al.*, 2016; Montag *et al.*, 2019; Oumlil and Balloun, 2019) researchers identified gamification as a method to facilitate learning process which will at least enhance the skills and knowledge levels of the users on a specific subject (Mitchell and Savill-Smith, 2004). The concept of *e-learning,* refers to a system based on formalized teaching with the help of electronic resources (Felea *et al.*, 2018). Today, e-learning is emerging as a popular learning approach used by many organizations (Jia *et al.*, 2011; Pasandaran and Mutmainnah, 2020).

Olafsen and Cetindamar (2005) mentioned that e-learning as the ability of system to electronically transfer, manage, support and supervise learning and learning materials. E-learning platforms and Web-based applications are very popular, allowing users to access information directly via internet (Zamfiroiu and Sbora, 2014). In higher education, e-learning is becoming increasingly popular owing to its advantages over traditional learning (Felea *et al.*, 2018). The concept of e-learning is no longer a component of the educational process only for university distance learning programs but also a resource, application and a combination of technologies to systematically integrate learning experience of the students from campus-based universities (Felea *et al.*, 2018; Jia *et al.*, 2011). Combining e-learning with gamification requires a considerable effort as educational games require strategizing, hypothesis testing or problem-solving, typically with higher order thinking rather than repetitive memorization or simple comprehension (Dondlinger, 2007). Therefore, meaningful *gamification* is the use of gameful and playful layers to help a user to find personal connections that motivate engagement with a specific context for long-term change (Behl and Dutta, 2020; Nicholson, 2015; Xi and Hamari, 2020).

During recent years "gamification" has gained significant attention among practitioners and game scholars (Huotari and Hamari, 2012; Mullins and Sabherwal, 2020; Tobon *et al.*, 2020). There is a significant body of research supporting the potential of using games as an educational tool (Paraskeva *et al.*, 2010). Paraskeva *et al.* (2010) developed educational multiplayer online games based activity theory, to improve collaboration among students. Ashraf *et al.* (2014) identified that online games are effective in vocabulary acquisition owing to interactivity and learner motivation. Connolly *et al.* (2006) proposed, a games-based learning environment to help the learner develop the skills on database analysis and design programs. Additionally, the use of games enhances the learners who may lack interest or confidence (Klawe, 1994) and self-esteem (Dempsey, 1994; Ritchie and Dodge, 1992). However, what has been missing from the current literature is that, up to date none of the studies focussed the influence of the social cognition stage of "persuasion" on gamification in e-learning context through the lens of the social psychology theory of "elaboration likelihood model" (ELM) by Cacioppo and Petty (1986). Therefore, the author introduced a conceptual model using the theoretical assumptions presented in the social psychology theory of ELM to facilitate future researchers to investigate the e-learning persuasion through gamification.

## 2. Theoretical background – elaboration likelihood model

The ELM is a dual process theory of attitude formation and change resulting in persuasion outcomes (Cacioppo and Petty, 1986). Attitudes are formed and modified as individuals obtain and process information related to the type of information they receive, and the cognitive energy each decides to expend to process that information (Cyr *et al.*, 2018). This model was introduced to the academic literature by Petty and Cacioppo in 1981. The ELM provides an organizing framework for persuasion that is argued to be applicable to various source, message, recipient and context variables (Cacioppo and Petty, 1986). Persuasion refers to human communication that is devised to influence the autonomous actions and judgments of others (Cyr *et al.*, 2018). The basic principle of the ELM is the presence of two routes to persuasion: the central and peripheral routes. These are anchored at two opposite

points on a continuum, which represents the likelihood of cognitive effort being expended to process a message (Kitchen *et al.*, 2014). It has now been over 20 years that the notion of "two routes to persuasion" was introduced (Chaiken and Trope, 1999) and over a decade, as ELM was translated into a series of formal postulates (Cacioppo and Petty, 1986). The ELM has been central to studies of consumer behaviour and has been referred to as one of the most influential theories in marketing communication research (Szczepanski, 2006). Depending on a person's motivation and ability, their elaboration likelihood will be either high or low, which will, in turn, determine the route through which persuasion may occur (Cacioppo and Petty, 1986).

The ELM stipulates that attitude change results from one of two message processing routes, central or peripheral, based upon a receiver's level of involvement with a message or his elaboration likelihood (Szczepanski, 2006). Therefore, based on this theory, message assessment occurs via one of two processing routes, central or peripheral, based upon the receiver's motivation, opportunity and ability (MOA) to process the message and their elaboration likelihood (Szczepanski, 2006). Central route processing occurs when consumers have enough MOA (high elaboration likelihood) to process the message. Here, individuals engage in effortful evaluation of the issue-relevant arguments, with resultant attitudes being enduring, resistant to change and predictive of behaviour (Chaiken and Trope, 1999; Cacioppo and Petty, 1986; Szczepanski, 2006). If motivation, opportunity, or ability are low (low elaboration likelihood), individuals will engage in superficial analysis of the message via the peripheral route. Here, individuals rely on simple peripheral cues, elements of the message not related to the message arguments, such as spokesperson credibility, to evaluate the message (Szczepanski, 2006). Attitudes formed via this route are less enduring, less resistant to change and less predictive of behaviour.

There are two distinct routes to persuasion in ELM, the central route, designed for high elaborators and the peripheral route, designed for low elaborators (Cacioppo and Petty, 1986). The central route is accessed via an individual's thoughtful attention to the quality of the information and argumentation in a message. On the other hand, the peripheral route is a way to persuade individuals unlikely to scrutinize the message itself but instead turn to affective cues embedded at the message's periphery. These peripheral cues include but are not limited to the credibility of the source, the style of the production, and the entertaining bells and whistles folded into its structure, such as the inclusion of music or a colourful logo (Cacioppo and Petty, 1985). It is important to consider whether someone is likely to carefully attend to educational information or process it peripherally (Rucker and Petty, 2006).

### *2.1 Central route to persuasion*

If a person is motivated and able to think carefully about a message (e.g. high personal relevance, few distractions), then he or she is likely to follow the central route to persuasion (Behaviourworks, 2020). In the central route, people focus on the elements of the message to determine whether its proposal makes sense and will benefit them in some way (Cacioppo and Petty, 1986). The central route to persuasion includes strong message arguments which makes individuals to generate predominantly favourable thoughts in response to the message and will experience attitude change in the advocated direction (as a result of more favourable thoughts being triggered than negative ones) (Behaviourworks, 2020). However, if the message contains "weak" arguments, then thoughtful receivers may generate more unfavourable than favourable thoughts in response to the message (i.e. the weaker arguments "fail" under heavier scrutiny) and will experience either no attitude change or a change in the opposite direction (Behaviourworks, 2020). Whether an argument is strong or weak is largely an empirical question that can be explored through testing different message content and ascertaining whether favourable or unfavourable thoughts were generated (Wagner and Petty, 2011).

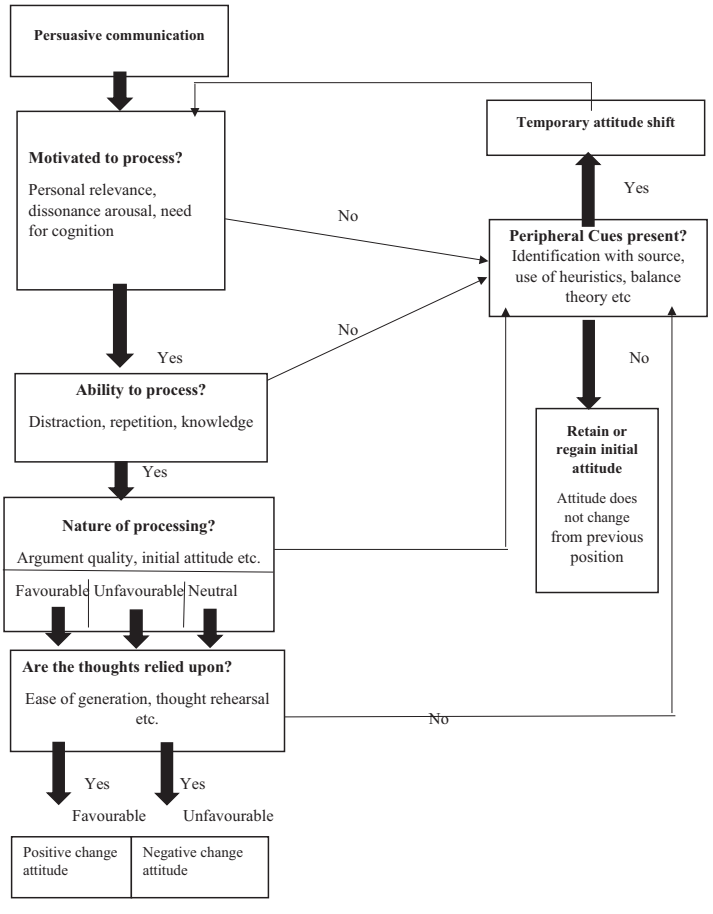
### *2.2 Peripheral route to persuasion*

In our daily lives, we often lack the motivation or ability to carefully consider every piece of persuasive communication in the way characterized by the central route (Behaviourworks, 2020). Further, attitude or even behaviour change can occur as some persuasion processes require little consideration of the arguments contained in a message (Cacioppo and Petty, 1986). In the ELM, such processes are organized under the peripheral route to persuasion and involve mechanisms where message recipients use simple cues or mental shortcuts as a means of processing the information contained in a message (Behaviourworks, 2020). For example, a cue might involve an emotional state (e.g. "happiness") that becomes associated with the message's advocated position in a positive way (Behaviourworks, 2020). Figure 1 depicts the schematic representation of the ELM as a series of formal prepositions (Lange *et al.*, 2011).

## 3. Methodology

This paper investigates the gamification phenomenon considering the social cognition stage of persuasion. The focus of this theoretical paper is to present a conceptual model

**Figure 1** Elaboration likelihood model schematic representation




**Source:** Developed by author based on the source of Petty & Cacioppo (1986)

based on the social psychology theory of ELM to investigate e-learning persuasion through gamification. In doing so, this paper systematically reviewed several journal papers, books and research projects. The systematic literature reviews (SLR) are often contrasted with traditional literature reviews, as systematic reviews are objective, replicable, systematic, comprehensive and the process is reported in the same manner as for reporting empirical research (Weed, 2005). A conceptual review paper aims to reconcile and then extend past research in a specific domain in a meaningful, conceptual way and a conceptual review can aid theory development and refinement (Hulland, 2020).

In doing so, this paper augments, recent related work looking at review articles in general by placing a greater emphasis on the role of theory (Hulland, 2020). According to Jaakkola (2020) conceptual papers ultimately share a common goal by creating new knowledge by building on carefully selected sources of information combined according to a set of norms. When considering the concept behind the conceptual papers, arguments are not derived from data in the traditional sense but involve the assimilation and combination of evidence in the form of previously developed concepts and theories (Hirschheim, 2008). Similarly, this paper presents a conceptual model using the existing theoretical assumptions in the social psychology theory of ELM. Even though, the concept gamification has been studies by many scholars, this is the first study to introduce a conceptual model to investigate the two different concepts of learning persuasion and gamification in the e-learning context. The author systematically reviewed the current literature through a database search using the "Publish or Perish" software using the keywords of *persuasion, gamification and e-learning*. In this study, author prioritized the studies which applied ELM in the context of e-learning persuasion through gamification considering the 'persuasion' as the keyword. However, as very few studies applied ELM in the context of e-learning persuasion and gamification, author reviewed other several studies which appeared in the search process which focussed on "persuasion".

Moreover, author reviewed studies published in top management, computer science, psychology and education fields across several databases (including Google Scholar, Scopus, Emerald Full text, ProQuest and Science Direct) without including any time restrictions. All results were limited to English only peer-reviewed studies. Table 1 shows the initial findings received from different databases.

Based on the initial findings a total of 1,308 articles been identified. As all these articles are not suitable to consider for the review owing to out of scope issues, mainly the articles within the scope of e-learning persuasion and gamification were considered and prioritized. Specifically, only the articles with results demonstrating a contribution to the e-learning persuasion and gamification context. Nevertheless, after removing the duplicated records and through reviewing the scope and contribution, a total of 1,188 articles were removed from the process and the remaining 105 articles were identified as qualified for further investigation. To maintain the quality of this review, the articles published in B or above in ABDC ranking and Q2 or above in SC imago ranking were included. Other than these rankings, several studies also included considering the higher impact factor of the journal and contribution of the paper. Therefore, another 25 articles were removed from the

**Table 1** Initial findings from the database search

| *Database* | *No. of articles* |
|---|---|
| Google Scholar | 990 |
| Scopus | 06 |
| Emerald | 19 |
| ProQuest | 240 |
| Science Direct | 53 |

**Source:** Developed by author

process to maintain the quality level of the review. Table 2 shows the inclusion and exclusion criteria.

The qualified 80 studies include journal papers, thesis and book reviews. These were summarized with four sections as source, focus, identified variable and tested components using Table 3.

Based on the Table 3, author identified a total of six variables (peripheral route and central route persuasion variables) representing the ELM theoretical assumptions.

## 4. Proposed research model and research prepositions based on elaboration likelihood model

As a result of the above literature review, six themes emerged which was categorised as central route and peripheral route persuasion variables. Therefore, based on the literature, identified three central route persuasion variables are argument quality, demographic variables and technology context. The identified three peripheral route persuasion variables are source credibility, social presence and message content.

### *4.1 Argument quality*

The central route is typically operationalized as argument quality, which refers to the persuasive strength of arguments in a message because it requires a person to think critically with regard to issue-related arguments and it is related to the users' involvement with the topic of persuasion (Cacioppo and Petty, 1986). Little is known as to what constitutes a high quality message, because as Wegener (1998) note, although message quality has been manipulated in myriad experiments, it is commonly done so to examine another variable (ex: source credibility). While definitive studies regarding the composition of high- or low-quality messages may be lacking, operationally defined message quality has been used to study this variable. In the case of e-learning, argument quality is a subjective evaluation of issues and contents provided by instructions in a class (Bhattacherjee and Sanford, 2006).

Further, Cyr *et al.* (2018) examined online persuasion through website designing through ELM through measuring the argument quality considering the characterizes of website information quality, appropriateness of the information and through completeness of information. Educational content delivered by the lecturer, consistency in the delivery method, quality of instructions represents the argument quality to deliver IT related modules (Lee, 2012). For, HIV prevention message efficacy both more aggressive and creative messages found as efficient in reaching people (Metzler *et al.*, 2000). Urh *et al.* (2015) identified that important elements in e-learning as pedagogical, technological, design, administration, human, financial and gamification elements. Wiggins (2016) used digital or non-digital games or simulations for graded assessments. Yildirim (2017) measured the effects of gamification-based teaching practices on student achievement and their attitudes

**Table 2** Inclusion and exclusion criteria

| *Inclusion criteria* | *Exclusion criteria* |
|---|---|
| Scope and contribution:<br>E-learning persuasion or learning persuasion<br>Gamification and learning in different contexts Studies with ELM theoretical application<br>Studies which applied any other psychology theory considering the social cognition stage of "persuasion" | Scope and contribution:<br>No contribution to the e- learning persuasion<br>No contribution to gamification research<br>Not considered the social cognition stage of "persuasion" |

**Source:** Developed by author

**Table 3** Summary of the key studies reviewed in this paper

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| Demographic differences | Alahäivälä and Oinas-Kukkonen (2016) | Systematically analysed the persuasion contexts of 15 gamified health intervention studies | Different age groups respond to gamified health behaviour change support systems in different ways |
| | Koivisto and Hamari (2014) | Studied demographic differences in perceived benefits from gamification in the context of exercise | Age, lifestyles and prior experiences shows more benefits from gamification to learn exercises |
| | Reynolds *et al.* (2013) | Studied the differences of beginner and non-beginner fitness practitioners' positions toward exergaming | Differences were identified among beginner and non-beginner fitness practitioners' positions |
| | Brauner *et al.* (2013) | Studied the effect of exergames in promoting physical fitness | Differences were identified on young vs. elderly players role on game types, personality factors and technical expertise on the performance |
| | Johnson *et al.* (2016) | A systematic review to assess the empirical effectiveness of gamification in the health and wellbeing | The energy consumption, conservation, efficiency with varying degrees of evidence had a positive influence for behaviour, cognitions, knowledge, learning and the user experience |
| | Deterding *et al.* (2011) | The use of video game elements in non-gaming systems to improve user experience and user engagement | The user experience of video games and user behaviour improved video game elements in non-gaming systems |
| | Terlutter and Capella (2013) | The study presented a framework for the analysis of advertising in digital games | Brand-related cognitive responses, consumers' preferences and decisions |
| | Wu *et al.* (2015) | This study presented a theoretical model to explain impact on the attitude and physical activity behaviour of users by drawing on social comparison theory to check key gamification elements incorporated in fitness apps | Perceived competitive climate and self-efficacy moderate the effect of social comparison on users' attitude in opposing directions |
| | Vashisht *et al.* (2019) | This paper critically reviewed the literature on advergames by performing a detailed analysis of existing research and proposed an organizing framework | Individual and social factors that effects on in-game advertising effectiveness are brand familiarity, product category involvement, state of flow, entertainment, persuasion knowledge, parental influence, maturity level of audiences and moods of the players |
| | Chow (2014) | empirical analysis of the efficacy of gamified recruitment procedures compared to traditional recruitment practices | Gamified recruitment processes will influence attitudes through both beliefs and affect towards the target organization or industry through the elaboration likelihood model |
| | Armstrong and Landers (2017) | This study provided evidence that modifying training content with game fiction can improve reactions to training while maintaining similar levels of declarative learning in comparison to unmodified training | The factors which affects the results varied owing to several demographic factors such as job tenure, employment, industry, education, race and gender |
| | Rao and Pandas (2013) | Reported the findings emerged from an analysis of recent mobile apps developed using gamification that stimulate behaviour change for depression | Employing badges, points, rewards and competition are probably not suitable for the specific needs of depressive users |
| | Algashami *et al.* (2018) | Investigated gamification risks related to teamwork within an enterprise | Digital gamification-based motivation differs based on the purpose of the game, persuasive technology, value sensitive design and group dynamics |
| | Rosa *et al.* (2018) | Gamified approach in the context of situational assessment | human beliefs, which are considered as basic construct for situational awareness |
| | Leong *et al.* (2019) | Examined the influence of electronic word of mouth and Elaboration Likelihood Model Influence on hotel booking | electronic word of mouth user expertise and user involvement affects hotel booking |
| | Alahäivälä and Oinas-Kukkonen (2016) | This article analysed the persuasion contexts of 15 gamified health intervention studies | The different user characteristics such as deciding which technologies to use, right actions on which to apply gamification affects the gamified health interventions |
| Argument quality | Cyr *et al.* (2018) | Examined online persuasion through website designing through ELM | Website information quality, appropriateness of the information, completeness of information |
| | Lee (2012) | Attitude changes occurring during IT acceptance from the perspective of elaboration likelihood model | Educational content delivered by the lecturer, consistency in the delivery method, quality of instructions |
| | Metzler *et al.* (2000) | | |

(*continued*)

**Table 3**

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| | | Examined the influence source credibility, message, quality and personal relevance on HIV prevention message efficacy | HIV prevention efforts must become both more aggressive and creative to better reach the men, women and teens at risk for infection |
| | Urh *et al.* (2015) | The following paper presented the model for introduction of gamification into the field of e-learning in higher education | Good e-learning management means organizing, planning, staffing, leading and controlling all important elements of e-learning<br>Important elements in e-learning are pedagogical, technological, design, administration, human, financial and gamification elements |
| | Wiggins (2016) | This article examined the use of both game-based learning (GBL) and gamification in tertiary education | Digital or non-digital games or simulations been used for graded assessments |
| | Yildirim (2017) | Study aimed to determine the effects of gamification-based teaching practices on student achievement and their attitudes toward lessons | The website provided more time to teach lessons as curriculum and blended learning procedure with more devoted time on lessons improves the quality of the learning |
| Source credibility | Lee (2012) | attitude changes occurring during IT acceptance from the perspective of elaboration likelihood model | Personality of the lecturer (qualifications, experience), comments or recommendations provided by the lecturer, scrutiny and conflict handling abilities |
| | Chen and Lee (2008) | influences of consumers' beliefs and perceived values on attitude, trust and approach behaviour were examined in online shopping | website content eliciting utilitarian shopping value, emotional stability, openness and extraversion |
| | Frewer *et al.* (1997) | Hazard type and source credibility have been identified as important in the establishment of effective strategies for risk communication | Message content covering food poisoning risks |
| | Metzler *et al.* (2000) | Examined the influence source credibility, message, quality and personal relevance on HIV prevention message efficacy | Perceived expertise, trustworthiness and attractiveness of the message source by the audience |
| Social Presence | Cyr *et al.* (2018) | Examined online persuasion through website designing through ELM | The users' involvement with the topic |
| | Hew *et al.* (2016) | Reported the effects of game mechanics on student cognitive and behavioural engagements through two experiment studies conducted in an Asian university | Behavioural engagement was monitored by using forum posts, video readings and forum posts viewing times<br>Cognitive engagement was monitored using factual learning (ex: post test scores) |
| | Barrio *et al.* (2015) | This paper analysed whether the integration of both Student response systems' and gaming techniques leads to better results in motivation, attention, engagement and learning performance than Student response alone | Gamification features include class playing (submitting questions to the students by teachers using gamification)<br>Providing opportunity to raise questions online (some connection statistics showing the number of students connected, their IP addresses, operating systems and browsers utilized by them)<br>Allowing students anonymous login<br>Splitting the learners into virtual teams<br>Allowing self-assignment to a group<br>Having multiple points reward criteria |
| | Berger *et al.* (2018) | Building on flow theory, study showed the high interaction of gamified features which facilitate self–brand connections, as such games leads to emotional and cognitive brand engagement | –By providing opportunity to view the video of the game (low interactivity) and playing he video of the game (higher interactivity)<br>– By providing opportunity to view the same visual impressions of the game for the same amount of time<br>– Manipulated challenge by varying game difficulty (example: the car drove at low speed on a straight and traffic–free circuit and the car drove at moderate speed on a curvy racing circuit with minor traffic) |
| | Cardador *et al.* (2017) | This paper presented a theory of work gamification, positioning work gamification as an intended enhancement of traditional performance management systems which promotes increased worker access to performance information | Work gamification improves work motivation (and subsequent performance) by providing workers with increased access to visible, comparable and immediate performance information |

(*continued*)

**Table 3**

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| | Hamari and Koivisto (2013) | Investigated how social factors predict attitude towards gamification and intention to continue using gamified services, as well as intention to recommend gamified services to others | Social factors can be used in gamified services are users' comments in the platform, peer notice and feedback |
| | Zainuddin *et al.* (2020) | This study presented a summary of the empirical findings of state-of-the-art literature in the emerging field of gamification within the educational domain of learning and instruction | Self-determination theory to design games related to learning<br>Flow theory, proposed by Csikszentmihalyi (2017) and goal-setting theory to contribute towards promoting active engagement and effective learning game elements that have capacity to reinforce a more enjoyable and engaging player experience with gamified learning experience |
| | Markopoulos *et al.* (2015) | A systematic literature review on the current gamification status examining various aspects of this novel term | Achievements been indicated as virtual or even physical representations of having accomplished something in the context given to the user by the game<br>Levels Progression is a mechanism which measures the user's percentage of success<br>Community collaboration and leader boards are aggregate feedback components used for tallying up the achievements<br>Other than above methods, the puzzle games, simulation games, strategy games can be used |
| | Hew *et al.* (2016) | Reported the effects of game mechanics on student cognitive and behavioural engagements through two experiment studies conducted in an Asian university | Behavioural engagement was monitored by using forum posts, video readings and forum posts viewing times<br>Cognitive engagement was monitored using factual learning (ex: post test scores) |
| | Barrio *et al.* (2015) | This paper analysed whether the integration of both Student response systems' and gaming techniques leads to better results in motivation, attention, engagement and learning performance than Student response alone | Gamification features include class playing (submitting questions to the students by teachers using gamification)<br>Providing opportunity to raise questions online (some connection statistics showing the number of students connected, their IP addresses, operating systems and browsers utilized by them)<br>Allowing students anonymous login<br>Splitting the learners into virtual teams<br>Allowing self-assignment to a group<br>Having multiple points reward criteria |
| | Sailer and Homner (2020) | This meta-analysis was conducted to systematically synthesize research findings on effects of gamification on cognitive, motivational, and behavioural learning outcomes | Learning delivery also facilitated by watching instructional videos and reading textbooks online |
| | Leaning (2015) | This article details the research findings of a study investigating the effectiveness of a learning and teaching project that involved the use of games to aid in student learning on a media theory module taught in a British university | Game mechanics was added to existing formative exercises using leader boards and scoring systems<br>Game mechanics were used such as a number of paper-based or space-based games (Ex: quizzes and crosswords) |
| | Wongso *et al.* (2014) | This paper explored related works on e-learning 2.0, gamification model and then developed a conceptual framework based on social engagement in Web 2.0 technology and gamification using design science research model as methodology | Self-assessment was provided through visible feedback or progress features Participation was provided through group feature for discussion or working on tasks together<br>Interaction was provided through adding comments or learning materials feature<br>Communication was provided through chat features |
| | Kwak *et al.* (2018) | This study contributed to the team literature and to the ELM in the context of team-based gamified training | Emphasised the importance of teams in gamification and persuasion |

(*continued*)

**Table 3**

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| | Stansbury and Earnest (2017) | The present study assessed the extent to which an industrial organizational psychology course designed learning environment with meaningful gamification elements to improve student perceptions on learning | Used a grading structures that incorporated meaningful gamification elements of play, exposition, information, choice and engagement<br>Included a system to encourage student role-play and to earn extra credit points following role-play rules as a class |
| Technology context | Alahäivälä and Oinas-Kukkonen (2016) | Systematically analysed the persuasion contexts of 15 gamified health intervention studies | Web-based solutions, mobile apps with sensors, or exertion-based gaming technologies to deliver the intervention |
| | Jones *et al.* (2014) | Gamification approach to increase fruit and vegetable consumption in schools | An ambient display was used as a medium, so there was no immediate interaction between the system and its users |
| | Deterding *et al.* (2011) | The use of video game elements in non-gaming systems to improve user experience and user engagement | Reward and reputation systems of gamified applications with economically inspired approaches such as incentive centred design |
| | Salvador *et al.* (2012) | An interactive public ambient display system, driven to motivate behaviour changes regarding domestic energy consumption, through a persuasive game interface based on gesture recognition technology | The gamified platform tool identified was a 'Motion-based Ambient Interactive Display' |
| | Rodrigues *et al.* (2016) | The development of business applications with game feature for e-banking sector | The software's used to develop game elements and game characteristics |
| | Van Lippevelde *et al.* (2016) | Using a gamified monitoring app to change adolescents' snack intake | The development active learning ability from the app, mere exposure, goal setting, monitoring and feedback.<br>Include automatic processes in the app such as rewards and positive reinforcement |
| | Dassen *et al.* (2018) | It was investigated whether a gamified working memory training in combination with an online lifestyle intervention would lead to improved self-regulation and increased weight loss compared to a lifestyle intervention combined with sham training | –Ability to track daily caloric intake via an online tool<br>–Own digital personal diet plans |
| | Aguiar-Castillo *et al.* (2020) | Examined the aspects that motivate a student's intention to use a gamified app as a complementary learning strategy in face-to-face education | Loss of privacy exerts a moderator effect on the relationship between the intention to use the gamified app |
| | Lucassen and Jansen (2014) | The results of this study provided a detailed overview of the contemporary attitude of marketing executives towards gamification | –Gamification platform should consist virtual badges, leader boards, competition levels to provoke the goals among the consumers |
| | De Troyer *et al.* (2019) | Proposed a playful environment to tackle school burnout, called TICKLE | –Gamification tools of this mobile location–based application are Cards module and a Diary<br>–The Cards module displays a (geographical) map on which cards are marked similar to performing a quiz or a small game<br>–By collecting cards, the youngsters can gather points that can be used to obtain rewards |
| | Reddy (2018) | Evaluated how teachers are trying to implement positive behaviour for learning in their classrooms and school-wide via an app | The teachers used the app extensively using recording and reporting behaviour through the app |
| | Orji *et al.* (2018) | Investigated how different gamification user types responded to persuasive strategies depicted in storyboards that represents persuasive gameful health systems | People scoring high in the "player" user type tend to be motivated by competition, comparison, cooperation and reward while "disruptors" are likely to be demotivated by punishment, goal setting, simulation and self-monitoring |
| | Boyle *et al.* (2017) | The study examined a gamified format for alcohol interventions | Gamified elements including a point-based reward system, the element of chance and personal icons to visually represent users, is more effective in reducing short-term alcohol use |
| | Dale (2014) | This article takes a critical look at the potential of gamification as a business change agent that can deliver a more motivated and engaged workforce | Gamified elements include game design techniques, methods to measure behaviours, set milestone goals, visualize accomplishments (badges, etc.) and bright colours |

(*continued*)

**Table 3**

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| | Chauhan *et al.* (2015) | This study investigated the positive impact of three techniques, namely, Augmented Reality, Adaptive Learning and Gamification in present learning scenario and studies how these techniques are being adopted by Massive Open Online Course (MOOC) to generate interactive and more engaging content | Learning process can be gamified with rewards, like points and badges, to motivate learners and engage them in better way.<br>Tools like, Docebo allow for corporate to create their own training environment with built-in Gamification<br>There are various ways in which course content and interaction is gamified and made interesting. Those are self-elements such as points, badges, levels and virtual goods, content unlocking, secret tips etc. fills students with a sense of self achievement and allow them to compete with themselves<br>Social elements, includes, Leader boards to allow students to compete with other students |
| | Dicheva *et al.* (2015) | This article reviewed empirical research on the application of gamification to education context | Gamification features of learning context include progress points, progress bars, levels, virtual goods/currency<br>Competition and cooperation/social engagement loops, badges, leader boards, levels, avatars, accrual grading Points |
| | Seidlein *et al.* (2020) | A new learning space, was developed to meet the medical students' individual learning needs better | A further development of e-learning tools such as the new learning space of this study seems promising and should be accompanied by larger and methodologically more intricate evaluation studies |
| | Subhash and Cudney (2018) | A systematic literature review of game-based learning systems, frameworks that integrate game design elements, and various implementations of gamification in higher education | The gamification features such as leader boards, scoring systems, paper-based games such as cross words and choose-your-own-adventure to gamify the course been introduced |
| | Strmečki *et al.* (2015) | Discussed the development phases of introducing gamification into e-learning systems, various gamification design elements and their suitability for usage in e-learning systems | Several gamified design elements are found suited for e-learning (including points, badges, trophies, customization, leader boards, levels, progress tracking, challenges, feedback, social engagement loops and the freedom to fail) |
| | Kuo and Chuang (2016) | This study applied gamification to an online context for academic promotion and dissemination | Platform structure with gamification features include leader boards, challenges in activities and rewards, thematic activities, challenging games and community tools which supports gamification platforms |
| | Çakıroğlu *et al.* (2017) | This study revealed the effect of gamified instructional process to student engagement and the relationship between engagement and academic performances in a real classroom | Gamified features include leader boards, virtual awards, assigning points |
| | Dias (2017) | In this paper, the experience of applying gamification in an Operations Research/Management Science course taught to undergraduate management students was described | The use of challenges, points, personalized feedback, badges and leader boards was considered to implement the most important game mechanics and related dynamics |
| | Sailer *et al.* (2017) | An experimental study on the effects of specific game design elements on psychological need satisfaction | Gamified features include points, badges, leader boards, games designed with meaningful stories, Avatars visual representations of players within the game |
| | Bovermann *et al.* (2018) | Examined online learning readiness and attitudes towards gaming in gamified online learning | Technological gamification elements as well as computer skills are important success factors for social interaction, social communication and learning outcomes<br>Scales for measuring online learning readiness include digital badges and progress bars |
| Message content | Allam *et al.* (2015) | The effect of social support features and gamification on a web-based intervention for rheumatoid arthritis patients | The content on decreased health care utilization, medication overuse and increased empowerment |
| | Slater and Rouner (2002) | The impact of entertainment-education messages on beliefs, attitudes and behaviour in terms of social cognitive theory principles | Narrative structure of the story or the message |
| | Dinoff and Kowalski (1999) | Applied combined efficacy of protection motivation theory and the Elaboration Likelihood Model to effectively communicate the AIDS risk | More personally relevant messages, more elaboration on message argument |

(*continued*)

**Table 3**

| *Identified central or peripheral route variable* | *Source* | *Focus* | *Tested components* |
|---|---|---|---|
| | Challco *et al.* (2015) | This study presented a model that describes concepts from gamification and its use as persuasive technology in collaborative learning scenarios | Personalized and gamified collaborative learning scenarios |
| | Nour *et al.* (2018) | Explored young adult perspectives on the use of gamification and social media in a smartphone platform to improve vegetable intake | Inclusion of details of several recipes within the apps |
| | Rao and Pandas (2013) | Reported the findings emerged from an analysis of recent mobile apps developed using gamification that stimulate behaviour change for depression | The need for designers of gamification for health to develop different standards that focus on collaboration, exchange, empowerment and esteem-building, compassion and altruism |
| | Nakada (2017) | This paper presented an example of a traditional instruction-based lecture course that was redesigned using a game-like design | Gamified lecture course includes active learning characteristics problem-based learning, entertainment education |
| | Tikka *et al.* (2018) | A gamified approach to promote rehearsal and reflection in a healthy eating context | –Message content includes a scoring system on how fast these players are categorized foods under positive or negative associations<br>–Game scores constituted feedback for reflection and repeated playing constituted rehearsal of target responses |
| | Jia *et al.* (2016) | Presented a survey study investigating the relationships among individuals' personality traits and perceived preferences for various motivational affordances used in gamification | –Extraverts tend to be motivated by points, levels and leader boards presented through gamification<br>–People with high levels of imagination/openness are less likely to be motivated by Avatars |
| | Besoain *et al.* (2020) | This study aimed to prevent sexually transmitted diseases by helping users to remember preventive measures in the risky situations | Gamified system named as UBESAFE was used to increase users' adherence and to engage users in the creation of preventive messages |
| | Llagostera (2012) | This study reviewed current debates around the gamification term and present definitions, as a basis for the analysis of gamification and persuasion | The rhetoric nature of the games improved epistemic connections and affinities |
| | Ferrara (2013) | This presentation explored how the native procedurality of video games makes them a potentially ideal way to persuade people to adopt a particular point of view | –Aesthetics comprises sensory elements like graphics, sound, haptics, themes and motifs, as well as contemplative elements like narrative, story arc and character development<br>–Rhetoric patterns of the message |
| | Marache-Francisco and Brangier (2013) | Graphics and persuasion aspects are associated with perceived gamification, despite the fact of usefulness | –Graphical designs and persuasive graphic designs of the message |
| | Basol *et al.* (2020) | Gamified inoculation boosts confidence and cognitive immunity against fake news | An online fake news game helped the people to learn about six common misinformation techniques |
| | Weiser *et al.* (2015) | A taxonomy of motivational affordances for meaningful gamified and persuasive technologies | Increase the competency of the user by guiding and instructing on how to use the site and its features through gamification |
| | Fan *et al.* (2015) | Examined the effects of learning styles and meaningful learning on the learning achievement of gamification health education curriculum | Gamification features of the message content includes self-learning features, game rules and feedbacks<br>Games create emotional identity to satisfy players, physically and mentally |
| | Sailer and Homner (2020) | This meta-analysis was conducted to systematically synthesize research findings on effects of gamification on cognitive, motivational and behavioural learning outcomes | Game Fiction Studies use narrative context (e.g., meaningful stories or avatars)<br>Learning delivery also facilitated by watching instructional videos and reading textbooks online |
| | Thorpe and Roper (2019) | This paper discussed the ethical dilemmas raised using gamified approaches to marketing | Information of different schools of ethics to examine gamification as an overall system, as well as its constituent parts |

**Source:** Developed by author

toward lessons through providing more time to teach lessons through websites. Therefore, these findings lead to the formation of the research proposition of:

*RP1.* Argument quality enhanced through gamification leads to e-learner persuasion.

### *4.2 Demographic differences*

There are many factors that could potentially influence a message recipient's motivation or ability to attend to a message and thus alter elaboration likelihood (Metzler *et al.*, 2000). Within the ELM, learner characteristics means the level of importance the message recipient places upon the presented message topic based on their behavioural, psychological or demographic factors (Cacioppo and Petty, 1986). Overall, the potential individual user characteristics were not extensively covered in the studies, the different user groups may respond to gamified interventions in different ways according to variables such as age, lifestyles and prior experiences (Alahäivälä and Oinas-Kukkonen, 2016).

Many studies identified the influence of demographic differences on gamification elements. For example, Alahäivälä and Oinas-Kukkonen (2016) stated that different age groups respond to gamified health behaviour change support systems in different ways. Koivisto and Hamari (2014) studied demographic differences in perceived benefits from gamification in the context of exercise. Further they identified that age, lifestyles and prior experiences shows more benefits from gamification to learn exercises. Differences were identified among beginner and non-beginner fitness practitioners' positions toward exergaming (Deterding *et al.*, 2011; Reynolds *et al.*, 2013).

Differences were identified on young vs elderly players role on game types, personality factors and technical expertise on the performance toward exergaming (Brauner *et al.*, 2013). The energy consumption, conservation, efficiency with varying degrees of evidence had a positive influence for behaviour, cognitions, knowledge, learning and the user experience (Johnson *et al.*, 2016). Individual and social factors were identified as factors on in-game advertising effectiveness for advergames (Terlutter and Capella, 2013; Vashisht *et al.*, 2019). Perceived competitive climate and self-efficacy moderate the effect of social comparison on users' attitude for key gamification elements incorporated in fitness apps (Wu *et al.*, 2015).

An empirical analysis of the efficacy of gamified recruitment procedures compared to traditional recruitment practices found that gamified recruitment processes will influence attitudes through both beliefs and affect towards the target organization or industry through the ELM (Chow, 2014). Armstrong and Landers (2017) provided evidence that modifying training content with game fiction can improve reactions to training while maintaining similar levels of declarative learning in comparison to unmodified training. The factors which affect the results varied owing to several demographic factors such as job tenure, employment, industry, education, race and gender (Armstrong and Landers, 2017). The recent mobile apps developed using gamification that stimulates behaviour change for depression could be used though gamification techniques such as virtual badges, points, rewards. However, it was identified that competition is probably not suitable for the specific needs of depressive (Rao and Pandas, 2013). Algashami *et al.* (2018) identified that digital gamification-based motivation differs based on the purpose of the game, persuasive technology, value sensitive design and group dynamics. Similarly, Dassen *et al.* (2018) identified human beliefs, as a basic construct for situational awareness through gamification. Furthermore, Leong *et al.* (2019) identified that electronic word of mouth, user expertise and user involvement affects hotel booking and Alahäivälä and Oinas-Kukkonen (2016) identified that different user characteristics such as deciding which technologies to use, right actions on which to apply gamification affects the gamified health interventions. Therefore, these findings further illustrate that gamification and e-learning persuasion could

change based on the different user characterizes or demographic differences which leads to the formation of the research proposition of:

*RP2.* Demographic differences affect the gamification through e-learning persuasion.

### *4.3 Technology context*

The technology context is identified as another central route persuasion method based on Table 3, as the technology plays a vital role in facilitating the gamification platforms used in e-learning. Several researchers measured the technology context using several gamification elements as follows. Web-based interventions has been identified as effective persuasion methods by researchers in health-care sector (Alahäivälä and Oinas-Kukkonen, 2016; Allam *et al.*, 2015). Several studies identified that the platforms such as ambient display (Jones *et al.*, 2014) and motion-based ambient interactive displays (Salvador *et al.*, 2012) as effective in delivering the ultimate message in gamifying context. Similarly, Deterding *et al.* (2011) used video game elements in non-gaming systems to improve user experience and user engagement.

Rodrigues *et al.* (2016) developed business applications with game feature for e-banking sector. Challco *et al.* (2015) suggested personalized gamified collaborative learning scenarios to deliver the content. Further, when developing gamified monitoring apps the development of the app should include active learning, proper organizing of the content, mere exposure, goal setting and automatic processes (Aguiar-Castillo *et al.*, 2020; Van Lippevelde *et al.*, 2016; Reddy, 2018). Algashami *et al.* (2018) suggested valuable gamification components such as value sensitive design and group dynamics. In the marketing context, Lucassen and Jansen (2014) provided a detailed overview of the contemporary attitude of marketing executives towards gamification. The leader boards and virtual badges have been identified as effective factors which enhance buying platforms which delivers loyalty, awareness and engagement among consumers. Gamification based "quizzes" were identified as another effective persuasion method for learners (De Troyer *et al.*, 2019). Gamified scoring systems improved the player competition and motivation, while punishments and self-monitoring demotivated the players (Orji *et al.*, 2018). Günther *et al.* (2020) identified gamification as an effective persuasive strategy for energy consumption.

Many researchers identified the effectiveness of several gamification elements in enhancing e-learner persuasion. Some of these elements are; virtual badges, virtual milestones, virtual levels, bright colour themes, rewards, virtual points, (Bovermann *et al.*, 2018; Chauhan *et al.*, 2015; Dale, 2014; Dias, 2017; Dicheva *et al.*, 2015; Kuo and Chuang, 2016; Markopoulos *et al.*, 2015) content unlocking strategies, secret tips, leader boards, digital crosswords, puzzle games, trophies, meaningful stories, virtual characters or avatars, outcome scales and accrual grading points (Sailer *et al.*, 2017; Seidlein *et al.*, 2020; Strmečki *et al.*, 2015; Subhash and Cudney, 2018). It is identified through the literature that, several gamification elements in the technology context could be used to improve the e-learner persuasion levels which leads to the formation of the research proposition of:

*RP3.* Technology context facilities the gamification through e-learning persuasion.

### *4.4 Source credibility*

Source credibility, can be defined as the extent to which the recipient of the information perceives an information source as believable, competent and trustworthy (Bhattacherjee and Sanford, 2006), referring to a message recipient's perception of the credibility of a message source and reflecting nothing with regard to the message itself (Sussman and Siegal, 2003).

Lee (2008) mentioned the students' perception of an instructor's competence and trustworthiness as a typical source of credibility. Most studies have adapted source credibility as a peripheral cue (Bhattacherjee and Sanford, 2006). When considering the IT acceptance, source credibility has been considered as a typical peripheral cue, as many users often rely on expert advice to learn about the latest technology (Bhattacherjee and Sanford, 2006). The information systems shows that perceptions of source credibility play a vital role in judgement of IT acceptance (Bhattacherjee and Sanford, 2006; Slater and Rouner, 2002). Also, the relationship between source credibility and attitude change was reviewed by many studies, and, thus, the items for measuring source credibility is well developed (Wiener and Mowen, 1986).

Several studies used source credibility in different gamification settings. Personality of the lecturer (qualifications, experience), comments or recommendations provided by the lecturer, scrutiny and assessment of issues was identified in education context (Lee, 2012). Alahäivälä and Oinas-Kukkonen (2016) used source credibility to examine gamified health intervention. Further, educational campaigns designed to facilitate preventive health behaviours (Dinoff and Kowalski, 1999); online shopping influence on consumers' beliefs and perceived values (Chen and Lee, 2008); hazard prevention though ELM (Frewer *et al.*, 1997); and media contexts (Basol *et al.*, 2020; Metzler *et al.*, 2000). Therefore, these findings further illustrated that gamification and e-learning persuasion is highly depend on the source credibility which leads to the formation of the research proposition of:

*RP4.* Source credibility affects the gamification through e-learning persuasion.

### *4.5 Social presence*

Social presence is identified as "the extent to which a medium allows users to experience others as being psychologically present" (Cyr *et al.*, 2018). Social presence in this study refers to teachers' ability to incorporate with students such as human contact, interactivity through gamification, sociability and sensitivity (Cyr *et al.*, 2007). This variable is used under peripheral cue. Cyr *et al.* (2018) used social presence as peripheral route to attitude change in designing website features. It is identified that gamified lecture courses can design with more active and problem-based learning approach (Berger *et al.*, 2018; Dassen *et al.*, 2018; Nakada, 2017) with more gamified socialization components such as comments of the peers, peer notice and feedbacks, team-based gamification performance, progress points, avatars, game fictions, grading scales or scores (Barrio *et al.*, 2015; Hamari and Koivisto, 2013; Hamari and Koivisto, 2015; Hew *et al.*, 2016; Kwak *et al.*, 2018; Ramadan, 2018; Sailer *et al.*, 2017; Stansbury and Earnest, 2017; Wongso *et al.*, 2014; Yamakami, 2013; Zamfiroiu and Sbora, 2014). Therefore, these findings lead to the formation of the research proposition of:

*RP5.* Social presence enhanced through gamification affects e-learning persuasion.

### *4.6 Message content*

The message content is applied in ELM under peripheral route to persuasion. Many studies applied ELM-based persuasion considering message content, message design or message appeal. For websites, it is the image appeal and navigation designs (Cyr *et al.*, 2018), for entertainment and education, it is the narrative structure of the message (Slater and Rouner, 2002), to frame exercise intentions the message content includes message framing on promoting physical exercise in university students (Jones *et al.*, 2003), for sport-related concussion education, it is the message design of concussion education programs (Turner *et al.*, 2019), for youth smoking prevention it is the smoking prevention messages (Flynn *et al.*, 2011), for HIV prevention, it is the message efficacy (Metzler *et al.*, 2000). More personally relevant messages were identified as more effective regarding learning (Dinoff and Kowalski, 1999; Nour *et al.*, 2018). Message content could be further improved through

game scoring methods (Besoain *et al.*, 2020; Jia *et al.*, 2016; Sailer *et al.*, 2017; Tikka *et al.*, 2018). Rhetoric patterns of the message were also identified as an effective sensory element (Ferrara, 2013; Llagostera, 2012). Therefore, these findings lead to the formation of the research proposition of:

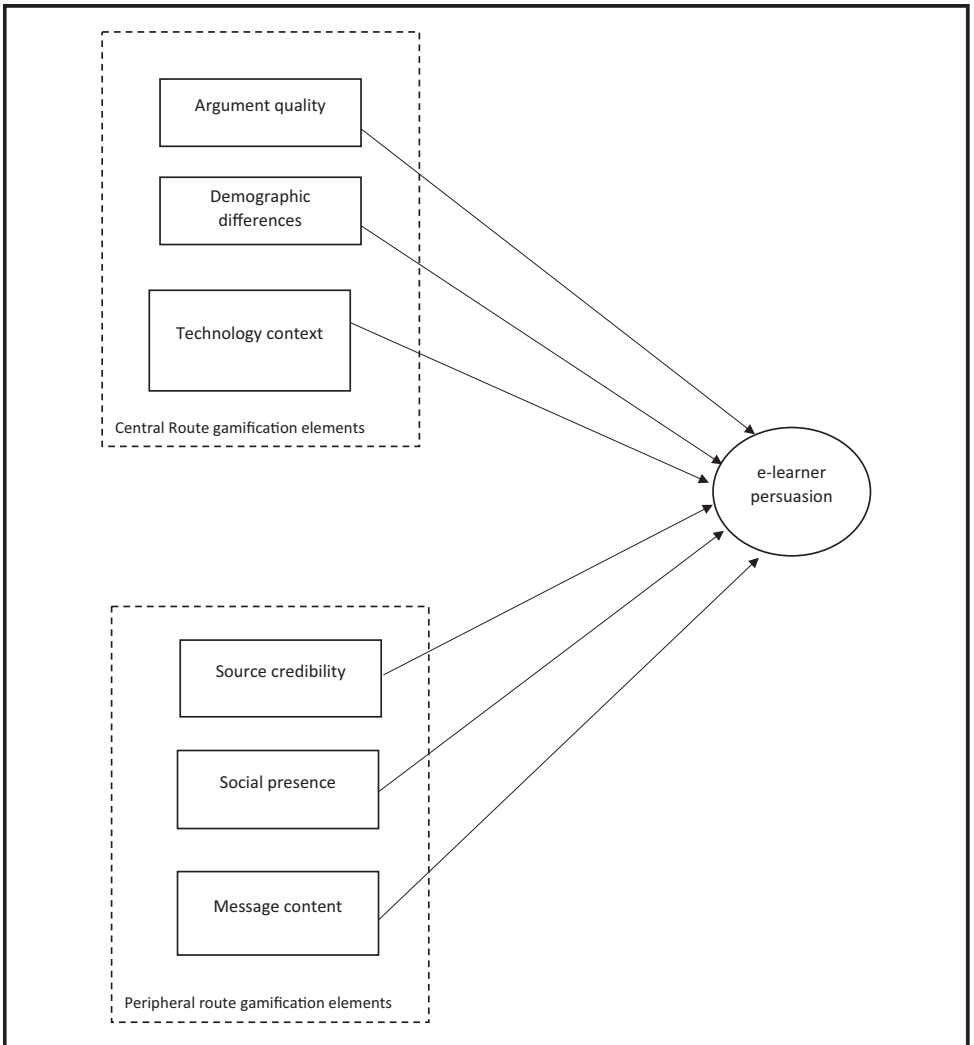
*RP6.* Message content enhanced through gamification elements affects e-learning persuasion.

Based on the above six research propositions, the author developed the below conceptual model to investigate e-learning persuasion through gamification (Figure 2).

## 5. Implications and future research perspectives of the study

The present study shows how education researchers can investigate the e-learning persuasion through gamification by introducing a conceptual model based on the social psychology theory of ELM. Consequently, the central route persuasion could be

**Figure 2** ELM-based conceptual model




**Source:** Developed by the author

conducted through argument quality, demographic differences and technology context facilitated through gamification elements. The peripheral route persuasion could be conducted through variables such as source credibility, social presence and message content. At the academic and research level, the proposed model to investigate the e-learning persuasion using gamification elements can be used to explain the different gamification platforms which could be used to generate more persuasion among e-learners. Future researchers can empirically test this model to investigate the e-learning persuasion through gamification in different contexts including primary, secondary and tertiary educational levels.

## 6. Conclusion

The author systematically reviewed several theoretical and empirical papers which applied the ELM in the contexts of education, marketing, computer science and psychology contexts. Based on the literature, author identified six major themes which leads to the formation of six research prepositions which facilitate to investigate e-learning persuasion through gamification which is an under researched area. This study contributes to the existing literature by developing an ELM-based conceptual model to investigate the e-learning persuasion using gamification elements which is a major theoretical contribution. The central route persuasion could be conducted through argument quality, demographic differences and technology context facilitated through gamification elements. The peripheral route persuasion could be conducted through variables such as source credibility, social presence and message content. To the best of the authors' knowledge, this study can be considered as the **first** theoretical paper which developed an ELM-based conceptual model to investigate the e-learning persuasion through gamification in education context which is an under researched area.

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