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## **AN EVALUATIVE REVIEW OF INNOVATION ADOPTION APPROACHES IN CONDUCTING EDUCATIONAL RESEARCH**

### **Abstract:**

Many approaches seek to describe the dynamic process of the implementation of innovation adoption. However, little is known about the factors linked to choices to adopt innovations and how the likelihood of adoption of innovations can be increased. The purpose of this review is to evaluate the recent practices of innovation adoption approaches in the field of education in the integration of mobile technology in the classroom. It presents an overview of the theories and approaches used to examine the process and effects of introducing new teaching methods into the educational system. The better the adoption approaches are understood, the more likely adoption challenges are addressed thus leading to primary operations.

### **Keywords:**

Adoption, educational research, innovation adoption approaches, innovation adoption theories

## Review and evaluation

Theories and approaches related to innovation adoption include but are not limited to Diffusion of Innovation Theory (Rogers 2003), Theory of Reasoned Action (Fishbein and Ajzen 2010), Enhanced Technology Acceptance Model (Venkatesh and Davis 2000), Unified Theory of Acceptance and Use of Technology (Venkatesh and Davis 2000), Social Cognitive Theory (Bandura 1999) and Activity Theory (Engestrom 1999). Many other approaches have emerged and have been developed from the above mentioned models and theories to conduct research into technology-use. In turn they have been practiced in various spheres of life, as well as in education (Grigoryan 2018).

<b>Diffusion of Innovation Theory</b>	<b>Theory of Reasoned Action</b>	<b>Enhanced Technology Acceptance Model</b>	<b>Unified Theory of Acceptance and Use of Technology</b>	<b>Social Cognitive Theory</b>	<b>Activity Theory</b>
Flexible attitudes	<ul style="list-style-type: none"> <li>• Beliefs</li> <li>• Attitudes</li> </ul>	<ul style="list-style-type: none"> <li>• Perceived ease of use</li> <li>• Perceived usefulness</li> </ul>	<ul style="list-style-type: none"> <li>• Performance expectancy</li> <li>• Effort expectancy</li> </ul>	Self-efficacy	Perceived ease of use
<ul style="list-style-type: none"> <li>• Comparability</li> <li>• Observability</li> </ul>	Subjective Norm	<ul style="list-style-type: none"> <li>• Subjective norm</li> <li>• Result demonstrability</li> </ul>	Social influence Facilitating Conditions	Outcome expectations	Result demonstrability

Table 1: Summary of Innovation adoption theories (Grigoryan 2018)

Though ICT adoption is a well-researched area of study in IT research, its application to education is still under investigation (Churchill and Wang 2014; Lai, Sham and Tian 2014; Meder and Wegner 2015). Some educational institutions today insist on integrating mobile devices without determining their benefits and possible negative effects on students' education. Funding, innovative ways of management, ecological problems, modern pedagogies, and other factors are all mentioned as hurdles for ICT adoption, yet the area lacks research and consensus (Meder and Wegner 2015).

Table 1 depicts six innovation adoption theories and discusses them accordingly. One of the approaches to the adoption of innovation that educational technologists will benefit greater understanding and awareness from is the diffusion of innovation theory. Diffusion of innovation theory explains how an idea or a product gains an impetus over time and diffuses through a specific population (Boczkowski 2010). It aims to study people's technology adoption in terms

of time, innovation, communication methods and the social system. This means that people adopt an innovative product or a new idea and perceive it as new or innovative. Ghezzi, Rangone and Balocco (2013) claim that diffusion theory should be revisited to identify external determinants that enable or hinder evaluation of the new technology prior to the technological activation phase in education. The model they propose addresses regulation, environment, strategy and technology (REST), which are the four determinants stimulating technology activation.

Another theory that believes that the behavioural target is shaped by the individual's attitudes and subjective norms is the Theory of Reasoned Action (TRA). It was developed to describe the connection of individuals' behaviours and attitudes within their actions. "The aim of the TRA is to investigate the relationship between attitude and behaviour based on two major concepts: principles of compatibility and behavioural intention. With this characteristic, the TRA is a predictive model and, therefore, is used in a variety of fields, such as banking, public, education, and industries to predict individuals' actions based on certain criteria" (Mishra, Akman and Mishra 2014, p. 30). The attitude and subjective norm are the central factors of individuals' objectives of implementing ICTs and were found to have a big impact on adopting ICT (Mishra, Akman and Mishra 2014; Doane, Pearson and Kelley, 2014). Several studies found that subjective norm affects individual's behavioural intention (Cooke and French 2008; Doane, Pearson and Kelley 2014), satisfaction, information sharing (Tsai, Chen and Chien 2012), and perceived usefulness (Venkatesh and Davis 2000).

The enhanced Technology Acceptance Model (TAM) suggests that perceived ease of use and perceived usefulness are direct channels of technology acceptance behaviours. As Gong, Xu and Yu (2004) define, "Perceived usefulness is defined as the prospective user's subjective probability that using a specific application system would increase his or her job performance within an organizational context" (p.366). Perceived ease of use, on the other hand, "refers to the degree to which the prospective user expects the target system to be free of effort" (p. 366). Several studies have used Enhanced Technology Acceptance Model as their theoretical background for explaining technology use and adoption (Gong, Xu and Yu 2004; Teo 2009) and found that perceived usefulness influences attitudes and satisfaction toward technology use (Limayem, Hirt and Cheung 2007; Venkatesh and Davis 2000).

The Unified Theory of Acceptance and Use of Technology (UTAUT) looks at how two factors: intention and behaviour, progress over time and are moderated by gender, age and experience (Venkatesh and Davis 2000). The determinants of intention are supposed to be the performance expectancy, effort expectancy, and social influence, whereas, the determinants of behaviour are supposed to be the intention and facilitating conditions (Venkatesh and Davis 2000).

Social Cognitive Theory (SCT) describes how the individual obtains and sustains a specific behaviour based on learning from others (Bandura 1999). This theory suggests that the acquisition of knowledge is related to observing others within the context of social interactions. It also explains that a specific behaviour can be influenced by final expectations and self-efficacy, while final expectations and self-efficacy can be affected by prior behaviour. Several studies have used SCT and found significant relationships with other concepts in ICT adoption and use, such as that self-efficacy can positively influence perceived ease of use and perceived usefulness (Chiu, Hsu and Wang 2006; Swearer, Wang, Berry and Myers 2014; Bandura 2002).

Activity Theory (AT), as propounded in Soviet psychology, is the umbrella term for several eclectic social sciences theories. It is not a predictive theory, but more of a descriptive framework, which studies the whole activity system beyond one user. “Activity Theory or Cultural-Historical Activity Theory is a cross-disciplinary framework for studying how humans purposefully transform natural and social reality, including themselves, as an ongoing culturally and historically situated, materially and socially mediated process” (Roth, Radford and Lacroix 2012, p. 1). Applying explanation of the activity to pedagogy enables specific activity system analysis to function as units of examination (Nussbaumer 2011). Literature is full of suggestions by educational theorists, such as Bonnie Nardi (1996), Jerome Bruner (2003) and others, on possible uses of the AT in educational theory, as well as in human-computer interaction design. As Koschmann (1998) explains, several publications encourage designers of computer-based artefacts to turn to the AT as a framework for analyzing user requirements. Because the activity of learning and its transformation have been vital in all times, it is no wonder that so many studies have been conducted on its nature, development and transformation (Grigoryan and Babayan 2017).

This review provided one step toward understanding the complex process of innovation adoption approaches by offering suggestions for research. Future research on innovation adoption approaches will likely produce advances that can improve the quality of educational research. Researchers could choose to focus resources on specific approaches, standardize, systematize, and clarify relationships between contexts and outcomes that are likely to lead to successful innovation approach adoption.

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