Gamification and Interdisciplinarity: Challenges in the Modern Knowledge Society

Christine Meschede, Heinrich Heine University Düsseldorf, Düsseldorf, Germany
Kathrin Knautz, Heinrich Heine University Düsseldorf, Düsseldorf, Germany

ABSTRACT

The enhanced use of information communication technologies in the knowledge society has a huge impact on how people learn and do research. In education, the trend topic Gamification has appeared, trying to fulfil the needs of digital natives. Likewise, researchers are challenged by new forms of collaboration. Interdisciplinary projects become more and more important. This article aims at combining these two trending topics of the knowledge society. Thus, the importance of Gamification in the scientific world in terms of disciplinary diversity will be measured. The goal is to identify predominant disciplines publishing on the topic and to detect collaborations in terms of multi- and interdisciplinarity. We firstly give an overview on the different research fields. Further, we introduce a way to measure disciplinary diversity of Gamification and classify the issue accordingly. Gamification presents itself as a multidisciplinary topic with an average of 4.2 references of different disciplines. In terms of interdisciplinarity a total value of 31% also represents a strong outcome.

KEYWORDS

Digital Natives, Education, Gamification, Interdisciplinarity, Multidisciplinarity, Research

INTRODUCTION

Today’s knowledge society is shaped by an enhanced use of information and communication technologies. Beside an immense technological and scientific progress new challenges arise that the modern world has to face. Two sectors in which these challenges come to the fore are education and scientific research. Scholarly communication has its origins in antiquity where interchanging of ideas took place orally (Ball, 2011). At the latest with the institutionalization of scholarly communication the main form of scientific correspondence was written texts. The way scientific output is created has changed immensely in the past years. Due to Ball (2011, p. 10) it “will be characterized by the simultaneity of oral, written, and digital scholarly communication”. Enhanced Science (E-Science) thereby leads to a new form of network-based, cooperative scientific work where communication technology enables researchers to work jointly together and to rely on information from a huge variety of data.

More and more collaborations between different research fields come to the fore in this context. A meaningful aspect in this regard is the concept of disciplinary diversity which is often labeled as

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interdisciplinarity. Sometimes seen as the solution for modern scientific and cultural problems (Wang, Thijs, & Glänzel, 2015), a lot of projects are funded due to their interdisciplinary aspects, e.g. by the National Science Foundation (‘Introduction to Interdisciplinary Research’, 2010). Other studies illustrate that long-distance disciplinary diversity in research breeds an enhancement of scientific impact in terms of perception and citations (Larivière, Haustein, & Börner, 2015).

Methods to measure this diversity are provided by informetrics, which includes all quantitative measures in Information Science. One subfield of informetrics is scientometrics, which is focused on scientific information (Stock & Weber, 2006). In this context, there already exist indicators to estimate the interdisciplinarity of a journal (Leydesdorff & Rafols, 2011) or an article (Rafols & Meyer, 2010), as well as measures for the disciplinary diversity of disciplines (Abramo, D’Angelo, & Di Costa, 2012) or institutes (van Raan & van Leeuwen, 2002). The goal of this article is to estimate the interdisciplinarity of a concrete topic – Gamification. The concept of Gamification which has its roots in the gaming industry and describes the use of game mechanics in non-gaming environments (Deterding, Dixon, Khaled, & Nacke, 2011) has been chosen as a trending topic. Playing is a cultural factor that has always been important in all kinds of societies (Huizinga, 1955). People play because it causes fun and sometimes even the so-called flow experience (Csikszentmihalyi, 1988). Nevertheless, games have been banned from the classroom for a long time described as being senseless. This has changed in the past years. Today, Gamification is a modern topic attracting increasingly the interest of companies as well as researchers. Hamari, Koivisto and Sarsa (2014) for instance detected a growing number of publications on the issue; particularly the increase of papers containing the term ‘Gamification’ in the title is noteworthy. This article combines the two trending topics by evaluating the disciplinary diversity of Gamification.

First of all, it is necessary to differentiate between varying levels of diversity. Stokols et al. (2003) discriminate between four types of disciplinary diversity: unidisciplinarity, multidisciplinarity, interdisciplinarity and transdisciplinarity. Whereas unidisciplinarity is based upon methods and concepts of one single discipline, multidisciplinarity describes a process of researchers from different fields working independently of each other on shared problem. In this process, each discipline has its own perspective and methods. On the contrary, if the researchers of the different fields directly work together on one problem, this process is called interdisciplinarity. Finally, the remaining constraint for transdisciplinarity work is a shared conceptual framework, as well as common methods and theories. Most bibliometric studies do not differentiate these different levels of disciplinary diversity, which is one aim of this work. Here, the focus is on multi- and interdisciplinarity of Gamification.

There are a lot of investigations concentrating on a mapping of Gamification, limiting the amount of publications on the topic to a minimum, which results in a small subset of the existing literature that can be evaluated intellectually with regards to contents (De Sousa Borges, Durelli, Reis, & Isotani, 2014; Hamari et al., 2014). This study does not aim at a fully content-related analysis, but rather a general assessment of the topic itself. Therefore, a preferably huge amount of literature is taken into account.

The paper is organized as follows: In section 2 the methods are presented, particularly focusing on the indicators used to calculate multi- and interdisciplinarity of Gamification. In section 3 the results of this calculation are given. Finally, the outcomes are discussed in section 4. In addition, a conclusion is made and some important limitations are mentioned.

**METHODS**

All results in this investigation are based on the set of publications that could be accessed on June 5th 2015 via the databases of Web of Science and Scopus. These information providers were picked as data sources, as they offer publications from several scientific fields and further enable an analysis of references and citations (Moed, 2009). In the databases the fields Topic (Web of Science), respectively Article Title, Abstract, Keywords (Scopus) were used to attain a set of articles. The single search
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