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Adoption of media by European scientists for the creation of scientific transmedia storytelling

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ABSTRACT

The purpose of this paper is to show a research plan on the adoption of user-generated media for the creation of scientific transmedia storytelling. The transmedia universe, currently becoming one of the most widely used generalist content dissemination strategies, has hardly any previous experiences in science communication. Its potential is enormous and to integrate it the scientist assumes a participant and active role in the transfer of knowledge to the society, spreading its work strategically by all communication media available. When it is time to study the role of the European scientist in this transmedia context, the first problem we encountered is its own implication. For this purpose, this study is based on the Unified Theory of Acceptance and Use of Technologies (UTAUT) model, which proposes that the intention to adopt technologies and the real adoption are positively influenced by the performance expectancy and negatively by the effort expectancy. We will investigate the current degree of media use through a questionnaire and will develop a group experiment with stimuli, to test the causality of the variables. The final objective of the research will be to know the effect of the variables on the actual use of the media and potentially to open new ways in scientific communication towards the scientific transmedia storytelling, as part of the work of the researchers, to reach a greater amount of public access to scientific knowledge.

CCS CONCEPTS

• **Human-centered computing~Collaborative and social computing** • *Human-centered computing~Interactive systems and tools* • *Social and professional topics~Professional topics* • *Social and professional topics~User characteristics* • Computing methodologies~Machine learning

KEYWORDS

Science communication, Scientific Transmedia Storytelling, adoption of technology, performance expectancy, Big Data, machine learning.

1 INTRODUCTION

Technology has changed the way people communicate with each other and therefore it also affects all the fields of our personal growth and social interaction. Media Ecology, focuses on analyzing how the media affect human opinion, understanding, feeling or value; And how our interaction with the media facilitates or impedes our chances of survival [1]. The word ecology implies the study of environments and their interrelationships: structure, content and impact on people [2]. The new technologies are decisive in the study of the media ecosystem today.

Issuers and users exchange their function with the broadcasters, removing the barriers between the communicator and his audience. In science communication, a relevant challenge is the adaptation to the digital age and the integration of all the media and processes that are part of the media ecosystem. However, the landscape of network media changes because there is no mediation of social communicators. Applied to the communication of science, this implies firstly the development of skills in function of an extension of the credibility of the text and not of the author [3].

The research plan described in this document focuses on the role of the European scientist as an individual communicator

within a universe of media and content generated by the user, in which he has the decision to adopt one or more media to spread their work.

To develop this study, the main framework will be the "Unified Theory on the Acceptance and Use of Technology" (UTAUT), which includes predictors of behavioral intention on technology adoption in general contexts [4]. The model posits that the behavioral intention and the use behavior of technological innovations are conditioned by the performance expectancy, with a positive influence in the intention of use, and by the effort expectancy that has a negative influence. The model also analyzes facilitating conditions and social influence as independent variables of positive or negative reinforcement, and moderating variables are sex, age and experience with technology [5].

This theoretical perspective will explain the factors that influence the adoption of technological tools for the creation of scientific transmedia scientific storytelling. In this sense, the work of this proposal can contribute to test a theoretical perspective already consolidated in other fields (information sciences, marketing, social studies of information and communication technologies), in the area of science communication, considering the challenges that the construction of transmedia narratives in the scientific discourse is proposing.

2 CONTEXT AND MOTIVATION THAT DRIVES THE DISSERTATION RESEARCH

The public communication of Science is a great responsibility that the issuers have to undertake with all the means at their disposal:

At the cultural level, an informed society with a solid scientific culture understands the development of science and technology as a fundamental element for the common evolution of society as a whole. In those countries that have a more advanced scientific culture, there is greater public support for science [6], and this encourages governments to take a more positive attitude towards the need to invest resources in research and development.

At the economic level, the question of which economic sectors will be the decisive factors in the future is a task that corresponds to the governments and, therefore, the political agenda is strongly influenced by the change of the productive model and the promotion of research and development, taking advantage of the University's resources to transfer knowledge to the business world [7].

At the social level because without science, society does not advance, innovation must be applied to all pillars of society. However, little is known about whether citizens are aware, prefer and support the need to invest in activities such as research and development, to better prepare the future, and their opinions on the role of public expenditure in the financing of research. Citizen preferences on public spending are factors that governments should consider [7].

The transfer of knowledge to society is the representation of that responsibility, because it responds to an increasing demand for information and symbolizes its effectiveness and transparency. It should be noted that the Spanish strategy for science, technology and innovation 2013-2020 has among its priorities the dissemination of a Scientific, Innovative and Entrepreneurial Culture that transcends society as a whole, promote creativity and encourage a greater degree of social and institutional acceptance of the entrepreneurship [8].

The actors involved have a fundamental function, the specialized journalist and the scientist, who adopts a role that traditionally belonged exclusively to the professionals of science communication [9]. In fact, the current environment is marked by the consolidation of global information networks, where media convergence and the emergence of transmedia narratives break with any traditional model of communication, modifying the ways of producing, distributing and consuming knowledge. Because of that it is necessary to understand what the new public communication processes of science may be [10].

Technology becomes a transversal axis of communication processes and in the field of scientific communication it is necessary to investigate new ways of narrating the discourse of science to reach audiences and achieve an effect in them.

Thereby the first question we ask is whether scientific discourse can be transmedia. And from this reflection, a step further makes us wonder if a narrative that wants to achieve an effect in the public dimension can afford not to be transmedia, that is, not to take advantage of all the media at its disposal to connect in each of them with the right audience. Transmediality could be understood as a functionality of the narrative [11].

Transmedia storytelling is a technological, economic and sociocultural process that meant technological convergence, that is, the emergence of new models of media adaptations [12].

In this proposal we will discuss the role of the scientist in Europe as a communicator of science and as a decision maker in the adoption or not of media for the creation and use of scientific transmedia storytelling as new ways of telling science where the discourse opens to new forms of participation, and reveal new qualities and potentialities of narration and collective action [13].

In this context, the digital citizen is not a passive element in their environment, but modifies and intervenes in the processes of content production, and also interacts with other users on issues of common interest [14].

We want to deepen in the role of the scientist in a transmedia universe by exploring and knowing the variables that influence him directly in the real use of media for the creation of his own story.

To the best of our knowledge, UTAUT has not been tested in media adoption for transmedia scientific communication. Thus, this project intends to fulfill this gap.

3 RESEARCH OBJECTIVES

The first objective focuses on the role of the scientist and the use he makes of technological innovation in the communication of science: (OG1) Analyze the adoption of media for the creation and use of Scientific Transmedia Storytelling.

(OE1) To know the degree of adoption of media for the creation of Scientific Transmedia Storytelling in the European environment.

(OE2) To know which are the variables that affect the intention of use and real use of media for the creation of Scientific Transmedia Storytelling.

The second focuses on the communication of science in user-generated media: (OG2) Implement and evaluate a real-time classifier of scientific messages on the social network Twitter with automatic learning techniques.

(OE3) Develop a prototype for the analysis of scientific messages on Twitter on a large scale and in real time using automatic learning techniques.

(OE4) Analyze and classify the messages produced on Twitter by European scientists during a specific period of time and test the classifier.

The third one focuses on proving the causality of the variables that determine the adoption of technological innovations: (OG3) To verify the effect that exists among the factors that influence the adoption of media for the creation of Scientific Transmedia Storytelling.

(OE5) Check if the performance expectancy predicts a behavioral intention of adoption and use of media for the creation of Scientific Transmedia Storytelling.

4 HYPOTHESIS

The research question that we elaborate, based on the problem posed and our objectives is the following one: RQ1 - What is the degree of adoption of media for the creation of Scientific Transmedia Storytelling in the European environment?

In line with previous studies culminating in the Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2) model, performance expectancy is the strongest predictor of behavioral intent on technology adoption in general contexts [16], and based on this, we postulate the following working hypotheses with the figure of the European scientist as subject of study:

H1 - The performance expectancy of European scientists influences the behavioral intention to use media to create Scientific Transmedia Storytelling, which also generates a positive indirect effect on the real use of the media. The influence of performance expectancy on behavioral intention to use is moderated by gender and age.

H1a - The influence of performance expectancy on behavioral intention to use is moderated significantly by gender, so that the effect will be stronger in men.

H1b - The influence of performance expectancy on intention to use is moderated significantly by age, so that the effect will be stronger in young people.

H2 - The European scientists' effort expectancy has a negative influence on the behavioral intention to use the media to create Scientific Transmedia Storytelling, which also generates a negative indirect effect on the real use of the media. The influence of the effort expectancy on the behavioral intention to use is moderated by gender, age and experience.

H2a - The influence of the effort expectancy on behavioral intention to use is moderated significantly by gender, so that the effect will be stronger in women.

H2b - The influence of effort expectancy on behavioral intention to use is moderated significantly by age, so that the effect will be stronger in older people.

H2c - The influence of the effort expectancy on the behavioral intention to use is moderated significantly by the experience with the technologies, in such a way that the effect will be stronger in people with limited experience.

H3 - The social influence of European scientists has a positive effect on the behavioral intention to use media for the creation of Scientific Transmedia Storytelling, which also generates a positive influence on the real use of the media.

H3a - The effect of social influence on behavioral intention to use is moderated significantly by gender, so that the effect will be stronger in women.

H3b - The effect of social influence on behavioral intention to use is moderated significantly by age, so that the effect will be stronger in older people.

H3c - The effect of social influence on behavioral intention to use is moderated significantly by experience with technologies, so that the effect will be stronger in people with more limited experience.

H3d - The effect of social influence on behavioral intention to use is moderated significantly by the will to use, in such a way that the effect will be stronger under conditions of mandatory use.

H4 - The facilitating conditions available to European scientists directly influence the real use of the media for the creation of Scientific Transmedia Storytelling and also are moderated by age and experience with the technologies.

H4a - The effect of facilitating conditions on real use is significantly moderated by age, so that the effect will be stronger in older people.

H4b - The effect of facilitating conditions on real use of media is significantly moderated by the experience with the technologies, so that the effect will be stronger in people with more experience.

In summary, these hypotheses present a conditional indirect effect of the performance expectancy, the effort expectancy and social influence on the real use of the media for the creation of Scientific Transmedia Storytelling, where the effect is driven through the variable behavioral intention of use and

the size of the effect is moderated by gender, age, experience and / or voluntariness of use. The facilitating conditions, in turn, have a direct effect on the actual use of technologies, moderated by age and experience. (Fig. 1).

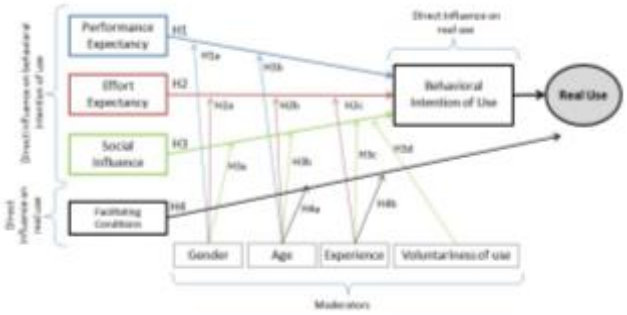

Figure 1: Own elaboration according to Research model UTAUT

5 METHODOLOGY

The present work is divided in three differentiated phases based on the general objectives that have been defined for the research project and will be carried out progressively with tests of validity and reliability applied to each instrument:

5.1 European scientists Survey

In a first phase, a field work will be carried out to know the degree of media adoption and to analyze the variables based on the UTAUT model:

European scientists Survey to know the degree of adoption of media for the creation of Scientific Transmedia Storytelling and the variables that influence the intention of use and real use of these media, following the UTAUT Model, the unified theory of acceptance and use of technology [5].

Subject of study: European scientists.

Object of Study: the intention to use and real use of media for the creation of scientific transmedia storytelling.

Variables: following the UTAUT Model [5], performance expectancy, effort expectancy, social influence and facilitating conditions will be established as independent variables. As dependent variables: the intention of use and the real adoption or use. Gender, age, experience with technology and voluntariness of use will be used as moderators.

Population: Research Personnel of the European Union.
Sample: a representative sample of the population under study will be selected.

Technique: Survey.

Instruments: online questionnaire developed for this purpose.

5.2 Analysis of communication contents of science in user generated media

In a second phase, a research work is carried out on messages written by European scientists on the social network Twitter, in order to make a specialized content analysis.

Analysis of communication contents of science in user generated media. A study with real time machine learning will be developed, where the subject of study will be the population of Europe that write tweets with scientific contents in a determined period and the object of study will be the corpus of published tweets that will be classified and analyzed. Specifically, the classifier will be able to distinguish those scientific tweets that present a transmedia discourse. This will allow us to monitor the transmedia scientific communication in Europe and obtain examples in real time that serve as stimuli for the experimentation of the third phase of the project. This technological development will be possible thanks to the fact that interesting advances are currently being made in the field of social sciences in convergence with the computer sciences, artificial intelligence and big data, especially with the Spanish research group "Observatorio de Contenidos Audiovisuales" (OCA), which is evidenced in recent impact publications contained in the JCR [15].

5.3 Experimental design with Scientific Transmedia Storytelling.

Finally, in a third phase, an experimental investigation will allow us to know the effect of the performance expectancy in the adoption and use of media for the creation of scientific transmedia storytelling. The experimental design will help us to understand the causal mechanisms that explain a given effect [16].

Experimental design with Scientific Transmedia Storytelling.

Subject of study: European scientists.

Object of Study: The effect of performance expectancy on the adoption and use of media by the study subject.

Variables: the independent variable is the performance expectancy and the dependent variable is the intention of adoption and use of media, which are moderated by the variables gender and age.

The independent variable will be manipulated by creating and showing stimuli in the form of real-time examples of scientific transmedia storytelling, such as videos, tweets, podcasts, online messages or digital content, and pieces created to test the increase in performance expectancy in subjects.

Sample: a specific sample will be selected for the experiment, consisting of an experimental group and a control group, with more than 10 subjects in both cases.
Technique: experiment.

6 DISSERTATION STATUS

Currently the research plan is in its early stages: deeply analyzing the state of the art, updating the references and beginning to plan the first phase of the field study through survey.
Over the next few months this study will be more advanced and the following phases can begin.

7 CURRENT AND EXPECTED CONTRIBUTIONS

From an eminently practical perspective, this dissertation proposal intends to contribute to broaden the vision that the European scientists have of their practices of science communication, to be able to include the necessary media and technologies to develop transmediality in their habitual narrative discourses, obtaining in this way to arrive at a growing public and socialize access to general scientific knowledge.
The narrative discourse of science can thus take a step further in the digital and multimedia ecosystem in which the public is immersed and achieve a real active and participatory listening.
Additionally, the methods and computer services implemented in this project can help public institutions, other researchers, as well as consultants and private companies in the field of public opinion, marketing and government studies, to study large numbers of scientific tweets in Spanish running real-time sentiment analysis without the limitations of dictionary-based approaches.

A HEADINGS IN APPENDICES

A.1 Introduction

A.2 Context and motivation that drives the dissertation research

A.3 Research objectives

A.4 Hypothesis

A.5 Methodology

A.5.1 European scientists Survey

A.5.2 Analysis of communication contents of science in user generated media

A.5.2 Experimental design with Scientific Transmedia Storytelling

A.6 Dissertation status

A.7 Current and expected contributions

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