# Evaluation of WhatsApp to Promote Collaborative Learning in the Use of Software in University Professionals

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**Abstract.** In this article we discuss how users of Mobile Instant Messaging (MMI) (WhatsApp) applications collaborate in environments that promote knowledge networks. For this study the researcher analyzed the interaction of users added to a group in WhatsApp, which is based on concepts of connectivism, communication, collaborative learning and knowledge creation. This study deals with the granting of knowledge on a specific computer subject and its transmission by all the members of the group, facilitating the work for the instructor and increasing the users' compression capacity. Each user can become an instructor for the new members of the group. Strengthening collaborative learning processes. Part of the study is the use of the questionnaire tool that collected information from group members, reception capacity, age and difficulties with MMI.

**Keywords:** Knowledge · Collaborative learning · Mobile Instant Messaging · Smartphones · Knowledge transmission · Creation of new knowledge

## 1 Introduction

With the rise and combination of the internet and learning, the way in which human beings work with the transmission of knowledge has changed more and more [1]. The emergence of new methodologies, tools and software seek to facilitate the acquisition and transmission of knowledge, changing the way of learning and avoiding dependence on a single instructor; diminishing the importance of socio-cultural aspects such as age, sex, gender, level of education or others [2].

The emergence of new technologies seeks to facilitate and support the learning process [3], and new collaborative techniques for the knowledge acquisition process are increasing [4].

According to the Household Panel of the National Commission on Markets and Competition (CNMC), by the end of 2017 the daily use of instant messaging services,

such as WhatsApp, almost doubles that of mobile and fixed calls. Instant messaging is used by six out of 10 people a day (60%), a figure far higher than the daily use of calls made from mobiles (24%), landlines (12%) or online (4%). SMS have become almost obsolete and are rarely used. Almost 60% of people in the study never send them (CNMC, 2017).

To [5], study how the use of instant messaging provides flexibility in communication between employees, improving the coordination and logistics of medical staff in caring for their patients. Other studies advocate direct and indirect improvements in work outcomes and performance when using instant messaging services at work [6, 7].

This seeks to analyze learning and how the parts act to reinforce it [8]. According to the literature [9], today we can identify three types of learning:

- Formal learning: occurs in structured environments such as educational institutions or companies. It uses validations to verify acquired knowledge [10].
- Non-formal learning: are those obtained in defined environments but that were not initially designed for that.
- Informal learning: it is obtained daily in the different activities and spheres. It is disorganized and unstructured learning.

The combination of these types of learning with new methods and/or methodologies of communication that appear, become vehicles to promote the transmission of knowledge that can build a society with more prepared individuals [11].

Multimedia messaging applications are perfectly compatible with learning communities [12], where through the proposition of a topic and a brief explanation conversations are developed, the first content can be shared freely with the whole group, which in the first instance gives rise to interaction between users and most importantly the transmission of knowledge between people.

In a literature analysis [13, 14], in the interactions as a product of the topic proposal one can very well acquire additional knowledge and improve the learning experience. From this point of view, it is feasible to cite the theory of connectivism [13] (online or offline) which identify that the learning process is enriched by the time of connection of the members of the group.

This article deals precisely with these last evidences, the propagation of information and learning between users in a certain group and their interaction in the event of queries or doubts that arise.

Publications such as [15, 16], focus more on collaborative learning between college and university students, rather than on university professionals who currently use WhatsApp to share information and knowledge. It is therefore necessary to analyze how university professionals use this technological tool for learning.

The platform used for the study is WhatsApp: which is an Internet messaging application. Currently owned by the company Facebook, having millions of users worldwide. Indirectly it becomes a tool for informal learning, based on connectivity.

In this way, the objectives of this article can be defined as follows:

1. Analysis of responses in conversations and interaction among group members.
2. Determine learning patterns in the use of multimedia messaging applications.

3. Evaluate the type of learning and transmission of knowledge between users, in order to study what types of learning take place in these environments.

The goals, and the rest of the content, concepts and definitions necessary for development are discussed in the sections: Materials and Methods, Results, Discussions and Conclusions.

## 2   Materials and Methods

### 2.1   Materials

**WhatsApp.** It has become one of the most popular applications for exchanging messages. It has been increasing its features allowing the exchange of multimedia content and even the making of voice and video calls [17]. It is intended to take advantage of these features to use them in favor of the diffusion, transmission of knowledge in a certain group. The use of this tool allows a constant interaction between the members of the group, increasing the capacity to transmit knowledge indistinctly of the schedule.

Knowledge is generated with the publication of a topic or indication and the participants or members of the group retransmit or add content allowing the creation of a cooperative model.

The study contemplates a data analysis of 18 months and approximately 75000 messages, using the indicated tool and the opportunities they offer in the field of learning. Depending on the characteristics of the WhatsApp tool, members of the group are placed with knowledgeable messages in the area of information technology in three days a day, Ecuadorian time:

- 8:00 am
- 14:00 pm
- 19:00 pm

In each of the sessions, different data on the use of institutional software was presented, allowing the members of the group to access and follow up on all the contents. The percentage of connection and revision of the exposed information varies according to the schedule in which it is published, in Fig. 1 the percentage of connections according to the schedule is offered. Of the 82 members of the group, 54 people reviewed the information from the first schedule until before the next publication, 67 people reviewed the information from the second schedule before the next publication, and 82 people reviewed the information published in the third schedule before the next publication.

Figure 2 shows the percentage of users who connect to the software and interact with each other, retransmitting the knowledge provided and providing constant feedback between members. In Fig. 3 we can show that only 9 users (10.97%) of the total needed the group moderator to instruct them again, the rest of users (89.02%) were able to receive the knowledge at the right time and/or through the active collaboration of the other members of the group, constant feedback between them. In other words, the

members of the group become channels of communication. Now in this context we can mention that for users with more experience in their respective positions it is easier to capture, analyze and process information to turn it into knowledge.
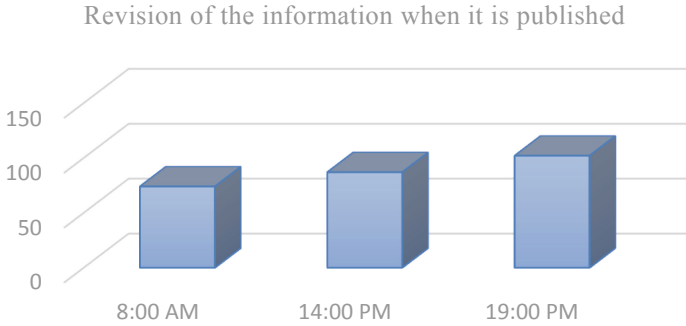


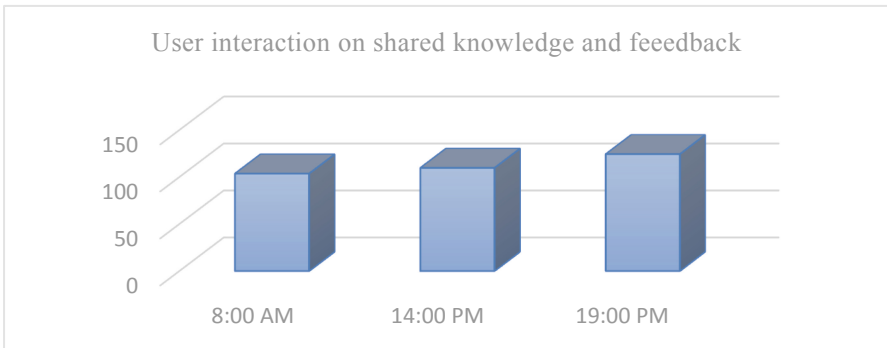**Fig. 1.** Review of information in published timetables.



**Fig. 2.** Statistics on the interaction of user's members of the group sharing knowledge to peers
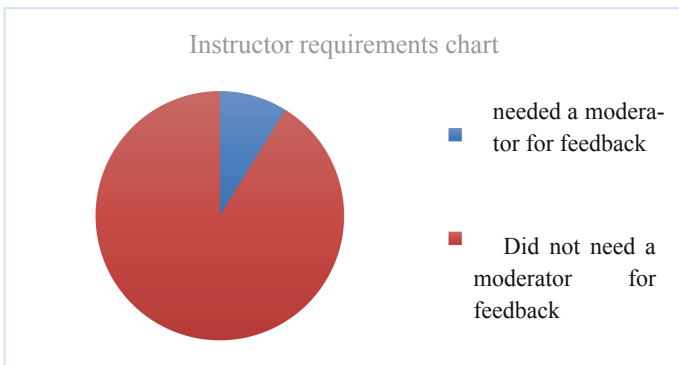


**Fig. 3.** Instructor need analysis. Once the knowledge is shared, the most experienced users provide feedback to users.

**Multimedia Messaging.** It is considered as the most evolving means to collaborate with the creation and transmission of knowledge. They play an important role in the learning process [18]. Allowing the creation of learning networks, for our study we have designed a case study to understand concepts in a practical way [17].

The topics proposed and exposed in the conversations, open forms of discussion and acquisition of knowledge from the non-formal point of view.

## 2.2 Method

The interaction of users in the group and the information contents is necessary to establish correct channels of information and retrieval [8]. In our case, between the members with their respective university positions and the reception and feedback to other users of the same group.

The methods used can be summarized as follows:

- The group's messages were exported from the WhatsApp application by sending them by mail and then downloading them to the PC in a TXT format.
- To filter the information and be able to analyze it, we use a spreadsheet tool.
- To obtain extra data and contribute to our analysis, we use the free app Analyzer for WhatsApp and access certain visual statistical features [11].

Additionally, the research is also observational and descriptive of the habits and behaviours of the individuals in the group. The technique used is quantitative. It was conducted to members of the Technical University of Ambato (Ambato, Ecuador) during the last months of 2017, every month of 2018 and the first quarter of 2019.

A total of 78 surveys were conducted and answered. After purifying the sample, eight of them were discarded when contradictions were detected in the answers or unanswered questions. The final sample is made up of 82 university professionals, of whom 35 are women and 47 are men.

Since this is a survey that adapts personal interview techniques, the answers correspond to the self-perception of the users about their frequency and purposes of use, the usefulness of its possible implementation in the academic work environment.

## 3 Results

### 3.1 Results of the Questionnaire

We have proceeded to use the questionnaire completed by users members of the group, which contains questions related to interaction, reception, transmission and feedback to help with learning. 102 users, of which 98% completed the questionnaire.

Figures 4, 5, 6, 7 and 8 show the data retrieved through the questionnaires and the segmentation of responses by age and position of the users. The Likert scale is used (1–5 with no null value).
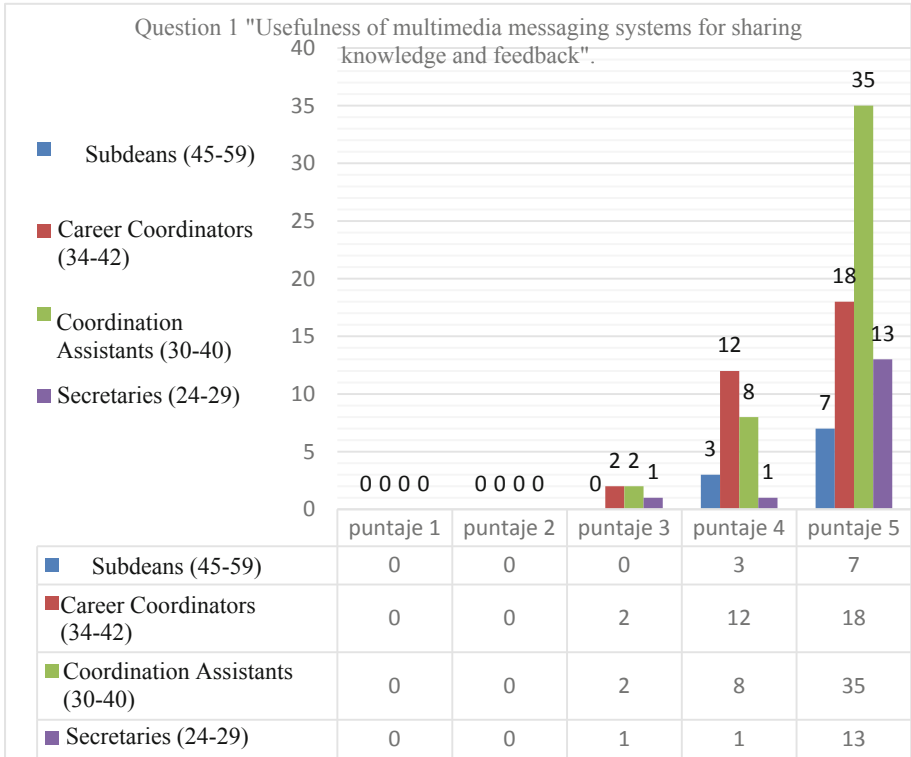
Fig. 4. Results of question 1 of the questionnaire. The use and feasibility of feedback among users are evaluated. Grouped by position or hierarchy and age.
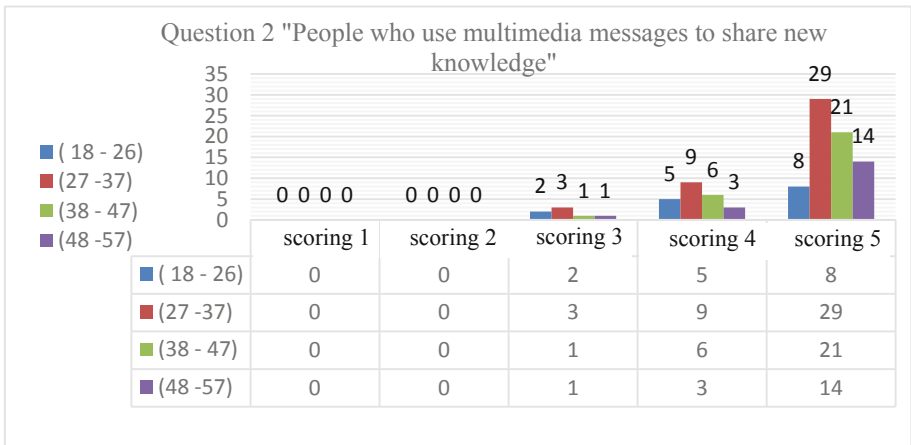


Fig. 5. Results from question 2 of the questionnaire, use frequently to share new knowledge and constant feedback to other users
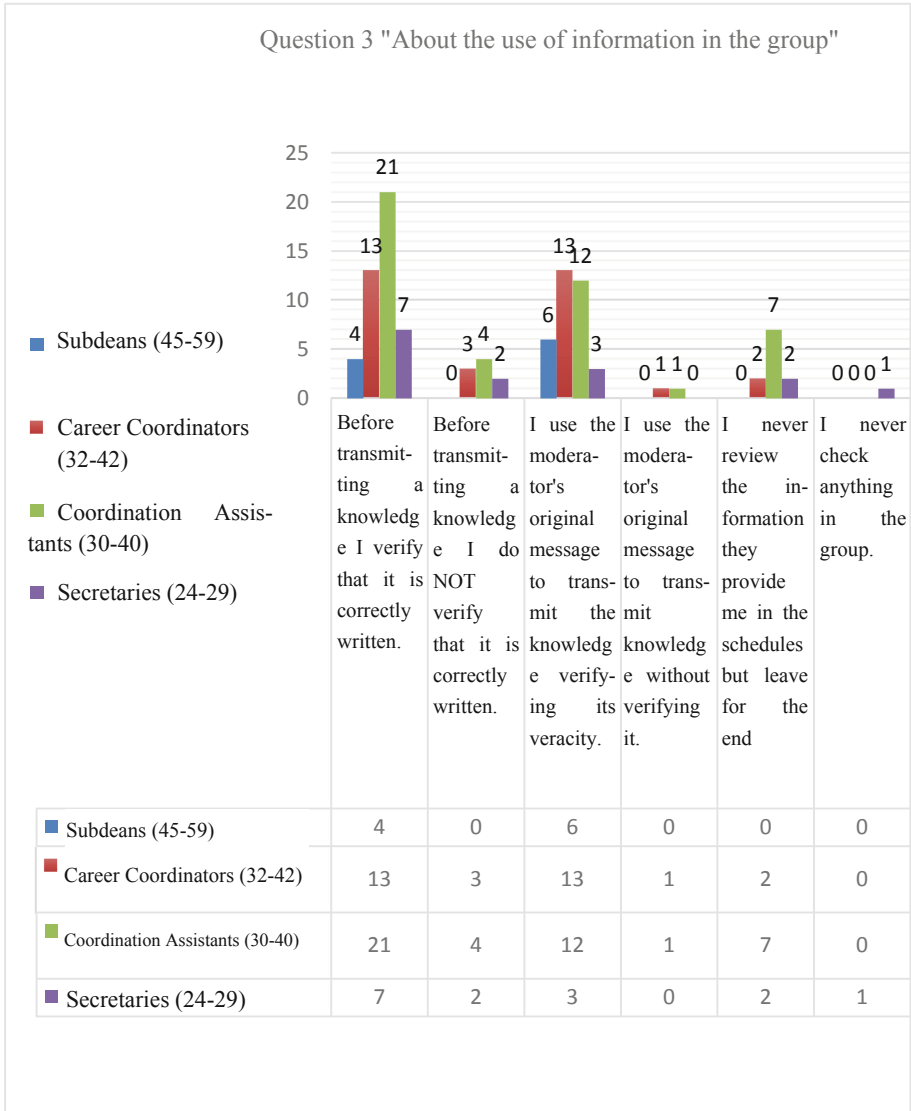
Fig. 6. Results of question 3 of the questionnaire, on the use of information in the group. Responses grouped by position.

## 3.2 Results Obtained in WhatsApp Statistics

In order to obtain results from the use of WhatsApp and review of the information entered, the information was filtered with the help of the Analyzer for WhatsApp tool and manual records.

Table 1 generates a report with the data obtained. Additionally, this information was evaluated to check connection time, transmission, collaboration and feedback.

**Table 1.** Statistical data of WhatsApp use and interaction in it

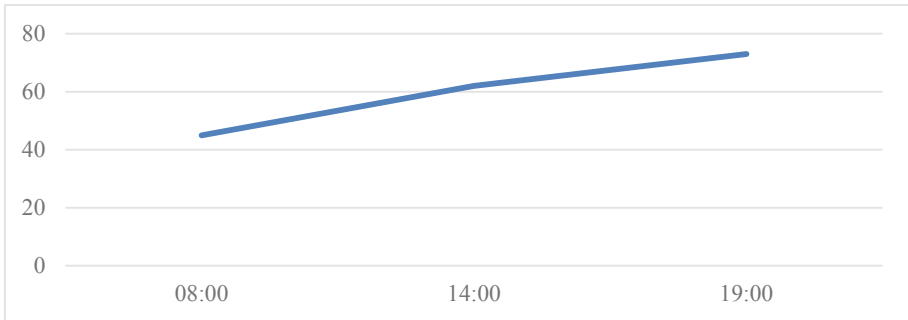| Publication hours | Immediate connections | Average replications per original message and per schedule | Average connection time in seconds | Average number of messages per day/day/week (considering that it is sent Monday, Tuesday and Wednesday) |
|---|---|---|---|---|
| 8:00 | 45 connections | 31 times | 6120 s | 6 |
| 14:00 | 62 connections | 45 times | 9180 s | 7 |
| 19:00 | 73 connections | 59 times | 34884 s | 6 |



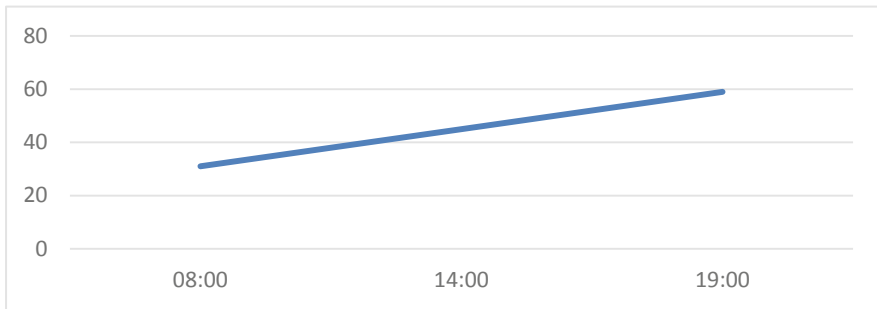**Fig. 7.** Evolution of WhatsApp use in the group



**Fig. 8.** Average of replicas of the messages published by the moderator of the group to transmit knowledge

## 4 Discussions and Conclusions

WhatsApp and other multimedia messaging tools represent a good opportunity for collaboration in learning and teaching new knowledge. They also provide useful features for formal and non-formal learning by allowing us to collect content and aspects specific to knowledge communities. Giving feedback on the content in the group and increasing the possibilities of opening channels of knowledge transmission.

WhatsApp is possibly the most notorious communication trend of our time and revolutionized written communication around the world. Regardless of age, this tool is constantly used to share information. The study shows that academic staff are highly dependent on instant messaging applications such as the one studied. Around 85% use the application more in the afternoon and evening. 50% of the staff read or wrote a WhatsApp in the group during snack hours.

From the point of view of the moderator of the group, the schedules of use is worrying, since it can affect in a direct way two aspects: the feeding and the rest, reducing the concentration and therefore the performance of the professionals when returning to their corresponding activities. It can also indirectly affect health, as it generates stress and anxiety, which accentuate this decline in work performance.

As a result of this work, we can deduce that the use of this tool by university professionals, can contribute to generate knowledge communities, as long as its use was appropriate. Being university professionals, the risk of sharing erroneous information decreases due to the degree of maturity of the people, and the capacity of assimilation increases. This study allows us to identify the hours of most use of the tool and the ability of people to retain knowledge and then retransmit it. People in middle and junior jobs use the tool the most and pass on knowledge.

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