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**INVESTIGACIÓN/RESEARCH**

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# ANALYSIS OF THE INVOLVEMENT AND REGULATION OF STUDENT WORK USING VIRTUAL TOOLS

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## ABSTRACT

This piece of research was carried out during the first semester of 2014-2015 at the Faculty of Education of Burgos. Variables of involvement and regulation of student work are analyzed from the preparation of live videos with Google Hangout that were uploaded to Youtube. The students participating in this piece of research are 126, all belonging to a subject of the degree in elementary school. Group A has produced the videos as a learning tool while group B did not use virtual tools. Pretest-posttest is done by analyzing the degree of modification of the variables at the end of the course. A mixed research method, both quantitative (descriptive and inferential) and qualitative (interviews), is used. The group using the videos (A) has a greater regulation of work, both in relation to the pretest, as compared to group B. In group A, the regularity in managing social networks has been the variable in which significant differences have been found in relation to the applicability of the learning generated. Interviews with teachers show a very different level in understanding and management of virtual tools for training purposes.

## KEY WORDS

Virtual tools – Involvement in work - Motivation - Regulation of work - Reflection on learning - Teaching perception – Student's perception - Mixed method - Methodological strategies

# ANÁLISIS DE LA IMPLICACIÓN Y LA REGULACIÓN DEL TRABAJO DEL ALUMNO MEDIANTE EL USO DE HERRAMIENTAS VIRTUALES

## RESUMEN

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Esta investigación se ha llevado a cabo a lo largo del primer semestre del curso 2014-2015 en la Facultad de Educación de Burgos. Se analizan las variables de implicación y regulación del trabajo del alumno a partir de la elaboración de vídeos en directo con Google Hangout y su subida a Youtube. Los estudiantes que participan en la investigación son 126, todos ellos pertenecientes a una asignatura del Grado en Primaria. El grupo A ha elaborado los vídeos como instrumento de aprendizaje mientras que el grupo B no ha utilizado herramientas virtuales. Se realiza un pretest-postest, analizando el grado de modificación de las variables estudiadas al finalizar la asignatura. Se utiliza un método de investigación mixto, tanto cuantitativo (descriptivo e inferencial) como cualitativo (entrevistas). El grupo que ha utilizado los vídeos (A) presenta una mayor regulación de trabajo, tanto en relación al pretest, como en relación al grupo B. En el grupo A ha sido la asiduidad en el manejo de las redes sociales la variable sobre la que se han encontrado diferencias significativas en relación a la aplicabilidad del aprendizaje obtenido. Las entrevistas realizadas a los docentes reflejan un nivel muy dispar en el conocimiento y manejo de las herramientas virtuales con fines formativos.

**PALABRAS CLAVE**
Herramientas virtuales - Implicación hacia el trabajo – Motivación - Regulación del trabajo - Reflexión sobre el aprendizaje - Percepción docente – Percepción del alumno – Método mixto - Estrategias metodológicas

## 1. INTRODUCTIÓN

Unquestionable is the exponential growth that has occurred over the past decade concerning the use of virtual tools and digital access to information (Marin, 2014). This also happens in education, where the options are endless to deepen and share information. Therefore, and as established by Liu, Liu & Chi (2014) conveying the contents to the student by the teacher is not as important anymore as regulating the work and searching for methodologies that encourage motivation and involvement of the student on what he learns. Information is present, moreover, there is a saturation of it, so the definition of strategies turning the student into an active member of the process and not a mere recipient of information becomes relevant (Detlor, Booker, mere Serenko & Julien, 2012).
There are many educational experiences at various stages using virtual platforms and various related tools to structure the formation processes (eg White, 2013; Flores, 2012; Roith, 2013). One of the variables that regulate their use, along with the complexity and volume of information handled, is the autonomy that the student must have in their management, the highest levels being reached in universities. As indicated by Lau and Lee (2015), it is not about assessing the mastery of the student on a specific tool but about reflecting on the educational use resulting from it and the applicability and relationship with the contents addressed in the classroom.

The possibilities to incorporate virtual tools for training purposes in the classroom

are endless, but they need adjustment and adaptation to the type of subject, the characteristics of students and the objectives to be achieved (Vargas Vargas, Mondejar-Jimenez Santamaria, Alfaro-Navarro, Fernandez-Aviles, 2011). A virtual tool itself is neither positive nor negative, since its potential derives from the use of it (Armstrong, 2011). What is clear is that today it is essential to raise evaluative resources in classes that promote student's reflection on what is learned, enabling deeper learning, comparing data with other members of the educational community and sharing experiences with classmates beyond the presence hours. One possibility to incorporate virtual tools is classroom work by groups using techniques structured into cooperative learning. This is essential to clearly define objectives, from the start, the group has to attain, the roles of each of the group members, and the way in which they will regulate their work (Cifuentes & Meseguer, 2015). The example discussed in this piece of research meets these requirements, and it is articulated from the development of group videos that are then uploaded to the network and which deepen the contents studied in class.

In this sense, the search for information in videos (whether tutorials, informative, wrap ideas ...) is a common and habitual resource among students, which is often performed by teachers in a poorly structured way and without training follow-up (Craig & Friehs, 2013). However, they can be a source of true knowledge of application to extend the labor resources and contrast information. It also implies a range of students in searching and self-managing their own resources, which may affect more motivation towards what is learned. Therefore, if we are aware of the benefits that such procedures may involve... why not allow students to create their own videos so they can be elements of reflection for the whole class? It is from this question that this piece of research result.

As Martínez-Berruezo and García-Varela (2013) state, there is no doubt that one of the main aims of the education system today is to make the student motivated to learn, and we need to establish working methodologies promoting that the student be involved in tasks without doing them only out of compulsoriness. Some pieces of research in this line as those performed by Kenny and Fluck (2014) indicate that one of the biggest problems in the university is lack of habit of students to regulate their work, students being often overwhelmed at the end of the course due to their poor management of time. This adds to other factors such as the limited teaching time available for the subjects and the use of master-lecture-articulated methodologies that do not favor the formative evaluation. That is why when the student uses and develops his own resources (as in the case of video) autonomously and group instruments in which the work done is recorded are defined, the generated learning is more meaningful and transferable to other contexts (Del Valle, Morales & Sumano, 2011).

This kind of open and participatory methodologies should be governed by implementing a feedback between teacher and student, both in the previous consensus of the methodology and the instruments to be used and in the evaluation system used. Similarly, it is essential that students make judgments of value to their classmates on a work done together, making co-evaluations be of an intra- or inter-group nature, as an appropriate procedure to have students involved in the teaching

process (Rodriguez Ibarra & Jimenez-Vergara, 2013). This type of evaluative way can be implemented along the course, always in a regulated way and for the main purpose of deepening the themes addressed.

The relevance of the methodology used by the teacher, and his own role in the subject, to generate dialogic, constructive and satisfactory learning processes is therefore shown. Regarding the latter, studies like those conducted by Bulman, Lathlean and Gobbi (2014) indicate that one of the indicators which contributes to reflecting on the teaching practice is the perception of students about learning received. In this sense, combining views and sharing experiences on the procedures used throughout the subject involve understanding the teaching process in an egalitarian way, finding the strengths and weaknesses that are inherently implicit when teaching something to someone. As set out by Gamlem and Smith (2013), when we do not hear what students think about what we want to teach, we are making one of the major mistakes that support the educational principle, which is to focus the teaching process with a unidirectional and undemocratic approach.

Therefore, and according to these evaluative approaches focused on the perception of students and teachers on the teaching generated, the present study analyzes the extent to which the development of videos as learning tools promotes involvement and regulation of students towards work.

## 2. OBJECTIVES

Analyze the assessment of students in relation to the implication and regulation of work before and after enlivening the experience developed with the preparation and presentation of videos.

Examine the difference established among groups regarding the transfer of the learning obtained in relation to the independent variables of age, use of social networks and previous experience in using Hangout.

Verify the perceptions of professors on the convenience of using virtual tools in the classroom as a motivating and learning element.

## 3. METHODOLOGY

### 3.1 Participants

There are 126 students participating in this study, there were 58.7% women and 41.3% men. The average age of students is 22.21 years (SD = 3.69). The subject in which this experience was conducted is Didactics of Physical Education, a compulsory subject in the second year of the Degree in Elementary School. Two groups were generated, A in the morning, consisting of 67 students, and B, in the afternoon, consisting of 59. In group A, students have developed their own videos with the Hangout tool to use it as a learning resource, while group B does not use any virtual tool as a learning tool. Each group was taught by a different teacher, one with five years of experience at university level (group A) and another with 35 years of experience (group B). The sample corresponds to normal parameters, obtaining a p = .214 in the Shapiro-Wilk test.

### 3.2 Instruments

#### 3.2.1 Quantitative

In the quantitative analysis, the questionnaire prepared by Castejon, Santos and Palacios (2013) which deals with the methodology and evaluation in the initial training of teachers is used. The applicability and usefulness of the instrument is checked since, in addition to positively correlating each of the items in relation to the total item, a validation was performed by a group of experts on the subject through a formative feedback process to reach a consensus. The reliability of the instrument is high, a Cronbach's alpha of 0.834, accepted as reliable, having been obtained (Corbetta, 2007). Each of the issues was built by identifying the predictive variables adapted to the objectives of the study. A confidence level of 95% is applied.
The questionnaire is made up of 17 items, the responses being structured in stages, with 1 being none and 5 being Much. The ratios obtained in the covariance matrix showed satisfactory fits for the RMSEA (Root Mean Square Error approximation) = 0.072. In this ratio, the values of less than .05 indicate a good fit, and values up to .08 represent reasonable approximation errors. In the CFI (Comparative Fit Index) a value of 0.9, indicating good fit is achieved.
After following the factorial analysis in the study, there are two resulting working factors:
1- Involvement in the tasks (nine items): issues related to motivation for the tasks, usefulness of the work done, follow-up carried out and positive perception of its performance are integrated.
2- Regulation of workload (eight items) related to work-planning aspects, the distribution of roles, the recording of information and feedback provided to the teacher along the course are addressed.

#### 3.2.2 Qualitative

A semi-structured interview with the two teachers who taught the subject, one in group A and one in group B, was used. The main purpose was to know in depth what valuation the teachers had about the use of NNTT-related instruments, analyzing their internal expertise and methodological application (Schatz, 2012). A structure of questions related to the factors of study and work with the media used in the subjects was developed. The fact that the interview was not closed allowed other related issues to be carried out, thus promoting continuity in the responses of teachers. This way, it is possible to create a scheduled dialogue as a conversation (Schatz, 2012), investigating and deepening in obtaining more specific and applicable responses (Smith & Osborn, 2003). In relation to the objectives of this piece of research and the analysis factors generated, teachers were asked five questions: 1. How do you think the students can engage actively in the learning process?, 2- Do you think it is important that students regulate their work?, 3- What assessment instruments used to achieve greater motivation for subjects do you consider important?, 4- To what extent do you consider favorably the use of NNTT to further

learning? 5- Do you teach how to use specific instruments or do students do it autonomously? Why?
Depending on the type of content addressed, the analysis factors and the saturation obtained in the responses, three categories in which the information is summarized have been generated: 1. "Methodological strategies used to encourage student's involvement", 2 "Procedures and instruments applied to students that promote work regulation, "3" Teaching the use of virtual tools as a means to guide and deepen learning "

### 3.3 Design and procedure

The subject, of the second course, has been taught throughout the second semester of the 2014-2015 academic year. Participants in both groups completed the questionnaire individually, before and after the subject was developed. Anonymity and confidentiality in the treatment of the data were guaranteed. Likewise, the importance of answering honestly was emphasized, because the answers would not influence anything in their ratings.
It is a subject with two groups, so the objectives and competencies to be achieved are the same and they are delimited in the teaching guide. It is nevertheless necessary to emphasize what the methodology used has been and how to proceed in each of the groups:
- Group A video processing: from the content addressed in the subject and reflective aspects generated in the practical sessions, students made their own working videos. In these videos, students delve into the themes worked on in the classroom, expanding information and making it fit in with the information published by authors in the field. These videos are then uploaded to Youtube, creating a channel for the whole class that later enables viewing and joint reflection by all students. A participatory methodology was carried out, using formative assessment related to research and search for solutions by the learner.
- Group B not making videos: in this group, no virtual instruments related to the regulation of work and autonomy by students are used. Most of the sessions are taught in the lecture, sharing this model with the development of breakout sessions. There is out-of-the-classroom continuation and extension of the content addressed in the classroom, which does not lead to regulation of work by the student, either individually or in groups. The only existing feedback is carried out by the teacher in the classroom, self-evaluation or co-evaluations not being made.

### 3.4 Analysis used

The method used is the mixed one, also known as third paradigm. Quantitative techniques have been combined by way of qualitative, descriptive and inferential analyses through interviews with teachers at the end of the process. The analysis is carried out both before the start of the course and afterwards, the level of involvement in the tasks and the work regulation in each of the two groups being analyzed. This type of methodological approach favors the contrasting of data and the complementarity of the results obtained, leading to a greater understanding of

why the results. In the case of educational interventions like this, Hall & Ryan (2011) indicate that mixed methods serve for the teacher to reflect on his practice, getting great information on the level of learning generated by the proposals developed.

### 3.4.1. Quantitative

A descriptive treatment (mean and SD) and an inferential one (ANOVA) are conducted for each of the two groups. Processing of data in the pretest-posttest is done through analysis factors, seeing if there are significant differences in factors between groups before and after developing the course. In the ANOVA, it is seen if there are group differences for the three independent variables used.

### 3.4.2. Qualitative

Data are obtained from the interview with teachers, contrasting the responses by analyzing the extracted content in relation to the generated categories (Fugard & Potts, 2015). Besides, they are triangulated, defining the answers that relate to that obtained in the questionnaires (Denzin and Lincoln, 1994).
The analysis of contents focused on finding patterns in the text, the extracts matching the folded patterns being coded (Saldaña, 2009). A first independent review was conducted by researchers. The reliability, credibility and transferability of data is ensured, since the elaborated categories were refined and perfected in order to give response to what was wanted to measure (Bryman, Becker & Sempik, 2008). As Beckett and Clegg (2007) recommend, text excerpts are presented in order to literally show some of the answers that are more consistent with the categories generated. These have been obtained by the saturation of the answers, using the registration program, computer analysis and Weft QDA information.
To facilitate the presentation of text and understanding of it by the reader, one acronym for each teacher has been identified, DTV (teaching who works with videos) and DNV (teacher who does not teaching with videos)

## 4. RESULTS

### 4.1Quantitative analysis: descriptive

| | PRE-TEST | | | | POST-TEST | | |
|---|---|---|---|---|---|---|---|
| | **N** | **Media** | **DT** | **Var.** | **Media** | **DT** | **Var.** |
| **Group video processing (a)** | | | | | | | |
| F.1. Involvement in tasks | 67 | 3.21 | .256 | .065 | 4.11 | .238 | .056 |
| F.2. Labor regulation | 67 | 3.35 | .311 | .096 | 4.42[aa] | .311 | .096 |

***Tabla 1.*** *Comparación de medias por factores para cada uno de los grupos en el pretest-postest (nivel de significación en las diferencias: *p <.05). Nota: Los superíndices reflejan los grupos entre los que se encuentran las diferencias significativas a nivel .05*

Before the subject was delivered, the means of the two factors were very similar between the two groups, in no case were the three and a half points reached. At the end of the course, data vary substantially, resulting in a significant increase in the work regulation factor in the group that developed the virtual videos relative to pretest. In this factor, significant differences between groups were reached too, with just over one point. The means of the two factors are higher in the posttest in group A, but in group B they also increase slightly.

**4.2 inferential analysis: ANOVA**

Depending on the analysis factors of the study and according to the items relate most to the transfer of learning from other contexts, the quantitative variable named "applicability of learning" has been generated. A one-way ANOVA for independent groups was performed to check for statistical differences between independent variables of age, regularity in the use of social networks and previous use of Hangout. Moreover, a post hoc indicating in which groups are the differences is performed. The age variable is categorized into: 1 "20 to 22", 2 "23 to 25" and 3 "over 25". The variable on regularity in the use of social networks: 1- "daily", 2- "weekly" 3 "never". The variable on knowledge of the hangout tool: 1 "regular use", 2- "I know it but I do not usually use it" and 3- "I do not know it" (Table 2).

| Applicability of learning | *F* | *gl* | *p* |
|---|---|---|---|
| **Group video processing (a)** | | | |
| Age | 87.31 | 3 | .241 |
| Assiduity use social networks | 83.63 | 2 | **.031*** |
| Prior use of the Hangout | 97.32 | 1 | .243 |
| **Group video processing (b)** | | | |
| Age | 91.56 | 1 | .271 |
| Assiduity use social networks | 86.12 | 2 | .172 |
| Prior use of the Hangout | 78.63 | 3 | .027 |

Table 2. Summary of ANOVA (Bonferroni) for each of the independent variables analyzed in the posttest (age, regularity in the use of social networking and knowledge of the Hangout tool)

*p <.05 from "daily" (average 4.23) to "never" (average 3.21)

The only independent variable in which there are significant differences in the applicability of learning is that of regularity in the use of social networks (F (67) = 83.63, p = .031). They are, within the group that produced videos, those that use them daily are the ones that have more transfer in learning from the course. In group B, no differences were found in any of the three variables.

**4.3 Qualitative analysis**

A lot of information out of all responses established for each of the two teachers was produced, the one that had no connection to the objective of the study being discriminated. Specific text extracts integrated in each of the three generated categories are specified: 1. "Methodological strategies used to encourage student's involvement", 2 "Procedures and instruments applied to students that promote the regulation of work," 3- "Teaching the use of virtual tools as a means to guide and deepen learning."

*Methodological strategies used to encourage student's involvement:* the two teachers consider it necessary to grant a practical course for students to develop their autonomy. However, the teacher who used the video as an instrument of work regulation is more analytical and rigorous in the methods used, the commitment of the students to use them being highlighted.

"The kids have to experience the practices a lot [...]". "I developed a series of sessions and the they do the rest, I think it is the best way to make them play the role of future teachers" (DNV). "I support that, for students to get involved in the tasks, it is necessary to establish a methodology that fosters their motivation, making sure that what they do has usefulness and transfer [...]" "It is not so much about what to do but about what for [...] "(DTV).

*Procedures and tools applied to students that favor the regulation of work:* the teacher who uses the video highlights the delimitation of previous criteria on evaluation and qualification to ensure accountability of students in the course. The teacher who did not use the virtual videos does not attach much importance to the definition of procedures and specific instruments of work:

"I always try to make students reflect on the practice, regulated very well the tasks demanded and be aware of the importance of teamwork with delineation of roles, consensus-reached self-evaluation and co-evaluations to the others" (DTV) "It is supposed they have to be mature enough to know how to manage their time [...]" "They know that, if they come to class regularly and make their sessions, they have no problems to pass "(DNV).

*Teaching the use of virtual tools as a means to guide and deepen learning:* in this category, there are substantial differences between teachers because the teacher of group A considered it essential to use these instruments to further the work done outside the classroom, while the teacher of Group B does not use any virtual instrument in her subject despite her recognizing their advantages:

"No doubt there are plenty of opportunities to work online with students, but honestly, if you do not know how to use them you cannot get into that world [...]" "I am also happy with the things I do (DNV)" "The use of videos has allowed the boys to deepen aspects studied in class. They decide the characteristics of the video, the

material to be presented, the argument to be followed, but always following a defined script [...] "" It has proven me to be a tool that has involved the student to the task and has served for deeper reflections (DTV)

## 5. DISCUSSION

It has been noted how the use of participatory methodologies related to the autonomous production of videos by students has encouraged their involvement in work, resulting in a suitable strategy to regulate learning in the demanded activities. Furthermore, in the group that produced the videos, there are significant differences between those who do not use social networks and those who do it daily, the latter being those who have perceived a greater transfer of learning.

The results show that, before the subject was delivered, there were no significant differences between groups in any of the two factors, even similar values being obtained. This aspect, in the pretest-posttest designs, is positive as it more rigorously shows the effects of the intervention plan on the studied variables (Brogan & Kutner, 2012). In addition, the average values of each factor did not reach 3.5 points, indicating that the perception of students about involvement in the tasks and work regulation in previous subjects was not very high. This justifies more the development of this experience, as a series of operating procedures related to the use of specific instruments favoring the regulation and organization of work based on the methodological guidelines used in each group are proposed. As indicated by Hortigüela Perez-Pueyo and Salicetti (2015), teachers must reflect on the perception of students on the methodology used in the classroom as it is the only way to adjust the claims of learning between teacher and student.

When the course ends, valuations change much, resulting in a significant difference in the factor of regulation of work in the group using videos in relation to the start. It seems therefore that the experience allowed students to plan their work regarding search for information, video presentation, delineation of roles in their presentation and later joint debate to draw meaningful conclusions, the latter being essential to self-evaluate acquired learning (Rodriguez Ibarra, & Jimenez-Vergara, 2013). As a result in the posttest, and in relation to this factor, the differences are significant between groups, with more than one point of difference. It seems therefore that the students appreciate the fact of being allowed to deepen their work autonomously, facilitating the use of instruments that will serve to be active in their own learning. This also allows searching for new ways to encourage sharing of experiences both with classmates as professionals working in network, which enriches the experience more (Roith, 2013). Therefore, despite the fact that the means of the two factors of the study are significantly higher in group A, which did not use the video as a training element, values also increased, albeit slightly. This indicates that, with the more traditional methodology used in group B, students did not experience a decline in their involvement in the tasks, showing that the practical experiences used in the sessions did not discourage the student in relation to the subject. In this sense, Redelius and Hay (2012) have papers that show a positive correlation between the assessment of the course made by the student and the grade obtained, which does not show adequate accuracy in responses.

Regarding the perception of the students on the applicability of learning obtained, the only group in which significant differences are obtained according to the independent variables of the study is the one that used the videos as a training tool. The variable is regularity in the use of social networks out of the classroom. The students who do it daily are those who believe that the experience of creating videos is applicable to other contexts, while those who do it regularly do not believe it so much. Experiences like Carmona Morales Jimenez-Homer, Vazquez and Morel (2012) indicate that the virtual management by students outside the classroom is not always related to specific practical working tools developed in class. It therefore seems important to distinguish between the useful learning time spent in virtual media and the one that is not regulated and defined for that purpose. In Group B, which has not used virtual media, no differences were found in any of the variables. This can be produced at the slightest difference of opinion among students in each of the two factors, perhaps because they are more used to taking subjects with these procedures. This can be seen in the lower values of DT that this group shows in the posttest. At age and previous knowledge of the Hangout tool, there are no intragroup differences, in contrast with other studies (Dappolone, 2013) indicating that younger students have a better perception of their use. The good reception of Google tool used is also shown, indicating its being ease to handle.

Data from interviews with teachers ratify the quantitative part of the study, showing an obvious difference in knowledge of ICTs and its subsequent implementation in the subject. The teacher of Group A gives greater prominence to the importance of the methodology for the student to be involved in work, emphasizing the delimitation of criteria accepted by the class as key to regulate the working environment. This approach leads to procedures generating self-evaluation and critical reflection on the learning generated, thereby further facilitating feedback among peers (Hortigüela Perez-Pueyo & Abella, 2015). The teacher of group B, although she did not use any ICTs, recognizes the possibilities ICTs can have in learning. In this sense, the teacher who used the video states that the key lies not so much in teaching many instruments as in actual and applied use of tools to give sense to what has been worked in the classroom.

## 6. CONCLUSIONS

Regarding the first objective, it has been proven how the group that made the virtual videos independently as a training element had an increase in both their involvement in the tasks and work regulation, this factor being the one that evolved a significantly in relation to both the pretest and among groups.

Regarding the second objective, in the independent variable of regularity in the use of social networking, differences were found regarding the applicability of learning generated. This happened in Group A, which indicates a more positive experience in the experience developed in the students who manage ICTs more.

In response to the third objective, the two interviewed teachers show a clear disparity of opinions regarding the implementation of virtual tools in the classroom, even though the teacher of group B recognizes their potential usefulness for learning. This

is associated with the use of a rigorous methodology defined by the teacher of group A.

We believe that this study may be of interest to all those teachers interested in developing methodological and evaluative proposals that ensure student's involvement in tasks, using virtual, friendly, easy-to-apply-in-the-classroom tools. The study has some limitations. First, the proposal only applies to one subject, it would be interesting to compare the data with others of different degrees. On the other hand, it would be convenient to assess the workload for teachers and students that can entail experiences like this, thus valuing more criteria to be used in class.

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