THE EFFECTIVENESS OF THE USE OF GOOGLE TOOLS IN THE MANAGEMENT OF RESEARCH PROCESSES IN THE FACULTY OF EDUCATION SCIENCES

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ABSTRACT

Objective: The study aimed to assess the effectiveness of Google tools implemented in the PIUSE platform for managing research processes in the Faculty of Education Sciences at the Universidad Nacional del Altiplano de Puno. The average age of the participants was 46.86±7.87 years.

Method: The research followed a quasi-experimental design and involved 125 teachers who served as jurors and/or advisors for the second specialty program at the Faculty. This study employed three instruments: an effectiveness questionnaire for reviewing research projects and reports (α=0.967), an effectiveness questionnaire for approving research projects and reports (α=0.894), and an effectiveness questionnaire for substantiating research projects and reports (α=0.882). The Wilcoxon signed-rank test was utilized to compare two related samples, before and after the implementation of the PIUSE platform, with a significance level of p>0.05, using IBM SPSS v.25 software.

The results: The PIUSE platform, which was built using Google tools, had a significant impact on the efficiency of project and research report review and approval (Z=-9.729; p<0.001), information sharing during review (Z=-9.702; p<0.001), and editing and proofreading during project and research report review (Z=-9.766; p<0.001).

Conclusions: The use of Google tools facilitated the efficient management of research processes in the Faculty of Education Sciences.

Keywords: Google tool, effectiveness, process management, research report.

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A EFICÁCIA DO USO DAS FERRAMENTAS DO GOOGLE NO GERENCIAMENTO DOS PROCESSOS DE PESQUISA NA FACULDADE DE CIÊNCIAS DA EDUCAÇÃO

RESUMO

Objetivo: O objetivo do estudo foi avaliar a eficácia do uso das ferramentas do Google implementadas na plataforma PIUSE para o gerenciamento dos processos de pesquisa na Faculdade de Ciências da Educação da Universidade Nacional del Altiplano de Puno.

Método: Esta pesquisa teve um desenho quase experimental, realizada com 125 professores que participaram como jurados e/ou orientadores do segundo programa de especialização da faculdade, cuja idade média foi de 46,86±7,87 anos. Três instrumentos foram aplicados neste estudo: questionário de eficácia para a revisão de projetos e relatórios de pesquisa α=0,967; questionário de eficácia para a aprovação de projetos e relatórios de pesquisa α=0,894 e questionário de eficácia para o apoio a projetos e relatórios de pesquisa α=0,882. O teste Wilcoxon signed-rank foi usado para comparar duas amostras relacionadas, antes e depois da implementação da plataforma PIUSE com nível de significância (p>0,05), com o software IBM SPSS v.25.

Resultados: A plataforma PIUSE, construída com as ferramentas do Google, influenciou significativamente a eficiência da revisão e aprovação do projeto e do relatório de pesquisa (Z=-9,729; p<0,001), a melhoria da revisão do compartilhamento de informações (Z= 9,702; p=0,001) e a edição e revisão na revisão do projeto e do relatório de pesquisa (Z= 9,766; p<0,001).

Conclusões: As ferramentas do Google permitiram o gerenciamento eficiente dos processos de pesquisa na Faculdade de Ciências da Educação.

Palavras-chave: ferramenta do Google, eficácia, gerenciamento de processos, relatório de pesquisa.

LA EFECTIVIDAD DEL USO DE LAS HERRAMIENTAS DE GOOGLE EN LA GESTIÓN DE PROCESOS DE INVESTIGACIÓN EN LA FACULTAD DE CIENCIAS DE LA EDUCACIÓN

RESUMEN

Objetivo: El estudio tuvo como propósito evaluar la efectividad del uso de las herramientas de Google implementadas en la plataforma PIUSE para la gestión de procesos de investigación en la Facultad de Ciencias de la Educación de la Universidad Nacional del Altiplano de Puno.

Método: Esta investigación tuvo un diseño cuasi experimental, realizado con 125 docentes que participaron como jurados y/o asesores del programa de segunda especialidad de la Facultad, cuya edad promedio fue de 46.86±7.87 años. En este estudio se aplicaron tres instrumentos: cuestionario de efectividad para la revisión de proyectos e informes de investigación α=0,967; cuestionario de efectividad para la aprobación de proyectos e informes de investigación α=0,894 y el cuestionario de efectividad para la sustentación de proyectos e informes de investigación α=0,882. Se empleó la prueba de rangos con signo de Wilcoxon, para comparar dos muestras relacionadas, antes y después de la implementación de la plataforma PIUSE con nivel de significancia (p>0,05), con el software IBM SPSS v.25.

Resultados: La plataforma PIUSE, construida con las herramientas de Google, influyó significativamente en la eficiencia de revisión y aprobación del proyecto e informe de investigación (Z=-9,729; p<0,001), en la mejora de la revisión del intercambio de información.
**Conclusiones:** las herramientas de Google permitieron gestionar eficientemente los procesos de investigación en la Facultad de Ciencias de la Educación.

**Palabras clave:** herramienta de Google, Efectividad, gestión de procesos, informe de investigación.

**1 INTRODUCCIÓN**

Over the last two decades, Google has revolutionized the way we communicate and access information (Diaz-Balteiro et al., 2023; Hu et al., 2019). Its impact on society is reflected in the democratization of knowledge, providing people with unprecedented access to a wide range of resources and data. (Santos, 2023). The use of Google tools in management worldwide is profound and transformative (Sundberg & Holmström, 2023). Workspace has transformed the way organizations manage internal communication and collaboration (Ziemba et al., 2023). Applications like Gmail, Google Calendar, and Google Drive offer a complete set of tools for real-time communication, task organization, and document storage. This allows teams to work more efficiently and in a coordinated manner, regardless of their location (Santos, 2023; Sundberg & Holmström, 2023).

Google tools are essential for managing research processes in computer science. They provide a comprehensive set of applications that facilitate the collection, organization, and collaboration of information (Waleed & Sajjad, 2023). Google Drive and Google Docs provide an online collaborative work environment that allows research teams to create, edit and share documents simultaneously, streamlining the flow of information and fostering collaboration (Chiu et al., 2023; Santos, 2023). In addition, Google Forms provides a valuable tool for data collection and conducting surveys. It simplifies information gathering and reporting. Google tools streamline the research process by facilitating access to resources and collaboration among researchers, consultants, and jurors, improving the efficiency and quality of results obtained in the field (Tharakan et al., 2024).

The pandemic has had a significant impact on university academic management in Peru, generating a series of challenges and opportunities for universities. (Vilela et al., 2021). The abrupt transition to non-face-to-face modalities has required a rapid and
effective adaptation on the part of universities, teachers and students (Valdivia, 2020). The current situation has emphasized the importance of enhancing both the technological and pedagogical skills of teachers, as well as ensuring equal access to educational resources and digital tools for all students, particularly those residing in rural or low-income regions (Loyola-Illiescas, 2021).

The management of research projects and reports in the Second Specialty academic program of the Faculty of Education Sciences at the Universidad Nacional del Altiplano was halted for several months due to the mandatory social isolation decreed by the Peruvian government through Supreme Decree N° 044-2020-PCM. This decree established a state of National Emergency and ordered mandatory social isolation, also known as quarantine, due to the serious circumstances faced by the country because of the outbreak of COVID-19 (Castro & Villena, 2021; Lossio, 2021). This period of isolation was extended by other Supreme Decrees. To quickly implement a system for non-face-to-face management of research projects, reports, and thesis support, the Second Specialty academic program created the Second Specialty Unit Digital Research Platform (PIUSE). This platform utilizes Google tools such as Google Docs, Google Forms, Google Sheets, Google Sites, and Google Meet. The aim of this research was to assess the effectiveness of using Google tools (PIUSE) for managing research projects, reports, and submitting theses in a non-face-to-face setting.

2 METHODOLOGY

The study involved 125 university teachers from the second specialty program of the Faculty of Education Sciences (FCEDUC) of UNA Puno. The average age of the participants was 46.86 ± 7.87 years, with the majority (65.6%) falling between the ages of 40 and 55. Of the participants, 66 (52.8%) were male and 59 (47.2%) were female. The majority of FCEDUC university teachers (72.0%) reported using the Internet for more than 4 hours per day. According to Table 1, the majority of participating teachers (76.8%) reported a medium level of proficiency in using ICTs and a similar level of training in the use of Google tools (77.6%).
The FCEDUC second specialty program has implemented the Second Specialty Unit Research Digital Platform (PIUSE), which utilizes Google tools such as Google Document, Google Form, Google Spreadsheet, Google Site, and Google Meet. The PIUSE platform includes regulations, annexes, sections for submitting thesis projects and research reports, and a section for requesting thesis support, as well as directories of jurors and advisors. The PIUSE platform can be accessed through a QR code.

In this study, the instruments were administered through Google Forms. The participants were informed about the purpose of the study, the importance of completing all the questionnaires, and the benefits of the research results for the improvement of research project management, research reports, and program support. The study's researchers developed questions to assess socio-demographic variables, including gender (female/male), daily internet usage (more than 4 hours, between 3 and 4 hours, and less than 3 hours), age (in years), proficiency in using ICTs (high, medium, and low), and training in using Google tools (high, medium, and low). For this study, each teacher participating as a jury and advisor in the second specialty program of FCEDUC was evaluated using three instruments. The evaluation criteria included their experience in

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**Table 1**

**Sociodemographic variables**

<table>
<thead>
<tr>
<th>Sociodemographic variables</th>
<th>X±DE</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46.86±7.87</td>
<td>24</td>
<td>19.2</td>
</tr>
<tr>
<td>under 40 years old</td>
<td></td>
<td>82</td>
<td>65.6</td>
</tr>
<tr>
<td>between 40 and 55 years old</td>
<td></td>
<td>19</td>
<td>15.2</td>
</tr>
<tr>
<td>over 55 years old</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>59</td>
<td>47.2</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>66</td>
<td>52.8</td>
</tr>
<tr>
<td>Hours of internet use per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 4 hours</td>
<td></td>
<td>90</td>
<td>72.0</td>
</tr>
<tr>
<td>Between 3 and 4 hours</td>
<td></td>
<td>30</td>
<td>24.0</td>
</tr>
<tr>
<td>Less than 3 hours</td>
<td></td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td>Mastery of the use of ICTs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>24</td>
<td>19.2</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>96</td>
<td>76.8</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td>Training in the use of Google tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>21</td>
<td>16.8</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>97</td>
<td>77.6</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>7</td>
<td>5.6</td>
</tr>
</tbody>
</table>
reviewing the project and/or report, approval of the project and/or report, and support of the project and/or research report before the pandemic (without PIUSE) and after the pandemic (with PIUSE). The evaluation was conducted between September and December 2023.

The study measured the effectiveness of Google tools using three instruments. This questionnaire evaluates the effectiveness of Google tools (PIUSE) in reviewing research projects and reports. It consists of four factors: efficiency, information sharing, editing and proofreading, and interaction. These factors were evaluated using eight items on a Likert scale ranging from strongly disagree (1 point) to strongly agree (5 points). The internal consistency of this instrument was $\alpha = 0.967$. This questionnaire evaluates the effectiveness of Google tools (PIUSE) in approving research projects and reports. It consists of four factors: Efficiency, Information Exchange, Editing and Correction, and Interaction in the approval process. The factors were evaluated using eight items on a Likert scale ranging from 1 (totally disagree) to 5 (totally agree). The internal consistency of the instrument was $\alpha = 0.894$. Questionnaire to evaluate the effectiveness of the use of Google tools (PIUSE) in the presentation of research projects and reports, this instrument consists of four factors: Efficiency; Information exchange; Editing and correction and Interaction in the presentation of research projects and reports, which were evaluated by means of 8 items evaluated with the Likert scale (from totally disagree = 1 point, to totally agree = 5 points), the internal consistency of this instrument was $\alpha = 0.882$. 
3 RESULTS AND DISCUSSION

Table 2

Effectiveness of Google tools (PIUSE) in the review and approval of research projects and report

<table>
<thead>
<tr>
<th>Factors in the review and approval of the research project and report.</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency in project review and research reporting</td>
<td>4,70±</td>
<td>7,68±</td>
<td>-</td>
<td>.000*</td>
</tr>
<tr>
<td>Exchange of information on project review and research report.</td>
<td>0,783</td>
<td>1,299</td>
<td>9,729a</td>
<td></td>
</tr>
<tr>
<td>Editing and proofreading in the review of the research project and report</td>
<td>0,857</td>
<td>1,614</td>
<td>9,702a</td>
<td></td>
</tr>
<tr>
<td>Interaction in project review and research report.</td>
<td>0,832</td>
<td>1,281</td>
<td>9,766a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0,924</td>
<td>1,703</td>
<td>3,654a</td>
<td>.054</td>
</tr>
</tbody>
</table>

Source: Research data

Wilcoxon signed-rank test (Z)

*p<0.0001

The PIUSE platform, built with Google tools, significantly influenced the efficiency of review and approval of the project and research report (Z = - 9,729; p<0.001), since the faculty jurors and advisors were able to review the projects and research reports by making comments on the project and/or research report as opposed to the face-to-face modality before the pandemic by COVID-19, where the thesis students delivered the project and/or research report to the jurors for review in a printed form. In the same way, the Google tools through the implementation of the PIUSE Platform, significantly influenced the improvement of the information exchange review (Z = - 9,702; p<0.001), and the editing and correction in the review of the project and research report (Z = - 9,766; p<0.001), the Google tools allowed the exchange of information between the jurors during the review of the projects and research reports in real time seeing the coincidences and similarities of the observations made. However, Google tools (PIUSE) did not influence the interaction between the jurors and the thesis student in the review of the project and research report (Z = 3.654; p>0.05), since in the classroom this factor reaches a greater space in the communication with nonverbal language.

The role of information exchange in the educational context through Google tools deserves careful reflection (Nakhla et al., 2017). While this suite of tools has transformed the way educators and students collaborate, it is essential to critically examine its pedagogical implications (Wang & Chan, 2024). The ease of sharing documents and resources in real time fosters collaboration and the joint construction of knowledge, which
is fundamental in today's educational process (Tay, 2023). However, it is imperative to consider how this instantaneous exchange can influence the individuality of learning (Diaz-Balteiro et al., 2023). On the other hand, facial expressions, gestures, postures and voice tones convey information that complements or even surpasses the verbal content (Rodríguez et al., 2018). In educational, work and social environments, the ability to interpret and use nonverbal communication effectively is essential for mutual understanding (Rodríguez, 2004). In education, a teacher's nonverbal communication can influence the classroom environment and the students' perception of the subject matter (Alonso et al., 2008).

Table 3

Effectiveness of Google tools (PIUSE) in the support of research projects and reports

<table>
<thead>
<tr>
<th>Factors in the project and research report</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency in the presentation of the project and research report.</td>
<td>5.81±</td>
<td>7.30±</td>
<td>-</td>
<td>.000*</td>
</tr>
<tr>
<td>Exchange of information in the presentation of the project and research report.</td>
<td>4.07±</td>
<td>7.59±</td>
<td>-</td>
<td>.000*</td>
</tr>
<tr>
<td>Editing and proofreading of research project and report submission</td>
<td>5.34±</td>
<td>7.23±</td>
<td>-</td>
<td>.000*</td>
</tr>
<tr>
<td>Interaction in the presentation of the project and research report.</td>
<td>5.39±</td>
<td>7.26±</td>
<td>-</td>
<td>.000*</td>
</tr>
</tbody>
</table>

Source: Research data.

* Wilcoxon signed-rank test (Z)

The PIUSE platform, which was developed using Google tools, significantly improved the efficiency of project and research report presentations (Z = -8.473; p<0.001). The use of Google tools allowed jurors, advisors, and thesis students to interact remotely, eliminating the need for physical presence during presentations. Additionally, the Google tools provided the following benefits: The results indicate significant differences in the exchange of information, editing and correction, and interaction during the presentation of the project and research report (Z = -9.588, p<0.001; Z = -8.661, p<0.001; Z = -8.587, p<0.001, respectively). During the presentation (001), Google tools facilitated real-time editing and correction of projects and research reports. Additionally, these tools enabled information exchange between jurors during the presentation of the projects and research reports.

The use of Google Meet in thesis presentations is a crucial tool that has significantly transformed the dynamics of academic presentations (Prabhu et al., 2017). This videoconferencing platform not only eliminates geographical barriers, allowing
remote participation of assessors and evaluators, but also facilitates fluid, real-time interaction (Vélez et al., 2018). The ability to share screenshots and presentations online provides submitters with the opportunity to visually highlight key aspects of their research, enhancing evaluators' understanding (Martín-Herrera et al., 2021, 2021). In addition, the real-time question and answer function promotes a more dynamic and enriching dialogue, providing participants with the possibility to clarify doubts or go deeper into specific aspects of the thesis (Chanto & Loáiciga, 2022). However, it is vital to address the considerations of the quality of the Internet connection and the need to ensure privacy of information (Gastélum-Escalante & León, 2022). Overall, the use of Google Meet in thesis submissions enhances accessibility, efficiency and flexibility in the evaluation process, constituting an invaluable resource in contemporary academia (Chiu et al., 2023; Valdivia, 2020).

4 CONCLUSIONS

The PIUSE platform, built with Google tools, has had a significant impact on the efficiency of the review and approval process for research projects and reports. This influence is reflected in the ability of jurors and faculty advisors to review projects and research reports by making direct comments on the documents, in contrast to the face-to-face mode prior to the COVID-19 pandemic. In addition, the implementation of Google tools through the PIUSE platform has greatly improved information sharing and the ability to edit and proofread during the review process. Although it has not influenced the interaction between jurors and thesis students, the platform has proven to be a valuable tool for facilitating real-time communication and collaboration among reviewers. These findings highlight the potential of digital technologies to improve academic processes and underscore the importance of continuing to explore new ways to leverage these tools in education.
REFERENCES


