# DETERMINANTS OF INSTRUCTIONAL TECHNOLOGY USE OF TECH-VOC EDUCATORS IN A STATE UNIVERSITY IN NORTHERN MINDANAO, PHILIPPINES

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***ABSTRACT.*** *Three years into the Covid-19 pandemic, it is essential to evaluate how TVL educators fare regarding the use of instructional technology in their teaching practice. The scarcity in literature from the perspective of TVL educators deemed it necessary that this study be conducted. This study aimed to evaluate the predictors that influence TVL teachers to use instructional technology in their teaching practice. This study employed a descriptive research design. 231 TVL educators of a state university in Northern Mindanao, Philippines responded to the online survey. The question items in the research instruments were adopted from the TAM, TPB, and MPCU theories. Results of the data analysis revealed that PU, PEU, FC, and BI significantly influenced the TVL educators' actual use of instructional technology. Based on the findings of this study it can be deduced that regardless of the learning environment setting, whether it is online or in-person, educators tend to have the same perspective when it comes to using instructional technology in their teaching practice. They will use it if it is easy to use, beneficial for enhancing their teaching practice, and readily available. This paper presents suggestions for future research studies in the area of instructional technology for TVL educators.*

**Keywords:** Instructional Technology, MPCU, Philippine State University, TAM, TPB, and TVL educators

## INTRODUCTION

Prior to the COVID-19 pandemic, face-to-face classes were the norm for educators, and the integration of instructional technology into their teaching practice was not as prevalent as it is now [1]. Before the pandemic, face-to-face classes were considered the traditional model of education delivery [2]. Educators have utilized conventional methods such as lectures, class discussions, and assignments to impart knowledge and foster learning. Although some teachers have voluntarily incorporated technology into their teaching practices, it is not yet a widespread practice [3].

The COVID-19 pandemic has necessitated a shift in the educational sector from traditional face-to-face instruction to flexible learning modalities. The pandemic has caused unprecedented disruption to education systems worldwide, resulting in the adoption of alternative forms of teaching and learning that rely heavily on technology [4]. In response to the COVID-19 pandemic, the Commission on Higher Education (CHED) issued a specific memorandum order, which aimed to ensure that higher education institutions (HEIs) in the Philippines continue providing quality education to their students while coping with the disruption caused by the pandemic [5]. The memorandum order required all HEIs to implement flexible learning modalities, such as online learning, blended learning, and modular learning, to enable students to continue their studies despite the limitations imposed by social distancing measures, whichever the most appropriate for their student's needs and the nature of their courses. It also required the institutions to establish procedures and guidelines for the delivery of flexible learning, including the use of technology platforms and the necessary infrastructure to support the students' learning [6].

Instructional technology has gained a significant level of importance in education during the COVID-19 pandemic. It is now considered a critical element in guaranteeing learning continuity and ensuring that equitable access to education is provided for all students amidst the crisis. The use of technology has enabled educators to deliver content and facilitate learning in engaging ways [4]. Technology has provided educators with the opportunity to employ inventive and innovative teaching techniques, leading to more engaging and effective methods of delivering educational content and enriching the learning experience. It has opened up access to a wealth of resources and learning opportunities, such as educational apps, podcasts, and webinars. Online tools and platforms, such as Learning Management Systems, have made it possible for teachers to track student progress and provide feedback in real time. The COVID-19 pandemic has made it clear that the incorporation of instructional technology is now an essential feature in education, even though it may not have been as widely adopted prior to the pandemic [7]. Recent studies have focused on the perspectives of Technical-Vocational-Livelihood (TVL) educators on the use of instructional technology during the COVID-19 pandemic in the Philippines. The TVL educators encountered various problems and challenges that hindered their effective utilization of instructional technology. These challenges were attributed to the lack of access to technology and limited digital literacy skills.

Despite these challenges, TVL educators have been finding ways to overcome them. Professional development programs and collaboration with other educators have provided opportunities for educators to improve their digital literacy skills and develop effective strategies for online instruction [8]. The solutions include the utilization of instructional videos hosted on popular platforms such as YouTube, which can be paired with communication via social media platforms like Facebook in order to further engender learning and engagement among students [9]. Furthermore, incorporating interactive learning objects into the curriculum may be an impactful means of enhancing the overall quality of education [10]. This is because the use of technology-based instructional materials can make learning more interactive and engaging for students.

Relative to the use of technology platforms to support student learning, Namoco [11] conducted a study prior to the onset of COVID-19. The study aimed to investigate the factors affecting the adoption of technology among educators at a Philippine State University. The findings of the study revealed that an educator uses instructional technology if it is useful to them in their teaching practice, easy to use and it is available in the workplace [11]. It is worth underscoring that this study was conducted before the onset of COVID-19. Four years after that study, and three years into the COVID-19 pandemic, it is deemed essential to survey how TVL educators are responding to the idea of integrating instructional technology into their teaching practice. The study's findings can help identify the factors that will motivate TVL educators to continue using instructional technology beyond the pandemic, as well as the challenges and barriers that may hinder their adoption. The study's results can be used to develop strategies and interventions that promote the effective and sustainable use of instructional technology in TVL education in the Philippines. Therefore, the general goal of the study is to investigate the factors that influence TVL educators to use Instructional Technology in their teaching practice.

**Research Problem of the Study**

This study sought to determine if the following variables significantly influence the use of Instructional Technology in the Context of TVL educators in terms of (a) perceived ease of use, (b) perceived usefulness, (c) Intention, (d) attitude, (e) perceived behavioral control, (f) subjective norms, (g) job fit, (h) complexity, (i) social factors, (j) affect towards use, (k) facilitating conditions, (l) long-term consequences.

**Conceptual Framework**

The Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Model of Personal Computer Utilization (MPCU) are well-established frameworks for understanding technology adoption and use. Each model has strengths and weaknesses in its approach, and together they provide a comprehensive view of the factors that influence individuals' use of technology. The TAM focuses on the perceived usefulness and ease of use of technology, while the TPB emphasizes the role of attitudes, subjective norms, and perceived behavioral control. The MPCU considers the individual, system, and organizational factors that influence technology acceptance and use.

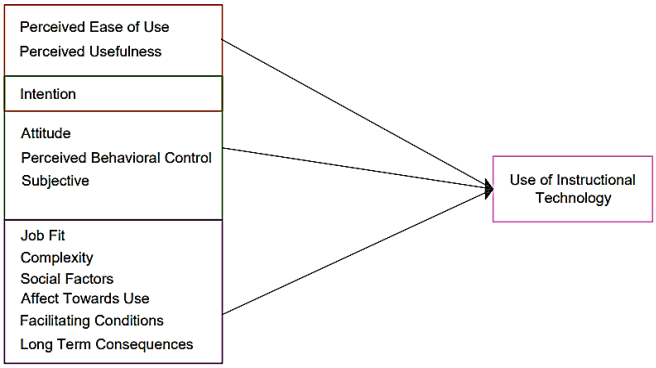


**Figure 1: Conceptual Framework of the study**

In the context of instructional technology use among TVL educators, a conceptual framework that merges these three models can provide a more complete understanding of the factors that influence their technology acceptance and use. By incorporating the factors that each model emphasizes, such as perceived usefulness and ease of use, attitudes, subjective norms, perceived behavioral control, individual and organizational factors, and socio-cultural context, this merged framework can better inform efforts to promote technology adoption and use among TVL educators.

## METHODOLOGY

This study aims to investigate the influence of perceived ease of use, perceived usefulness, Intention, attitude, perceived behavioral control, subjective norms, job fit, complexity, social factors, effect towards use, facilitating conditions, and long-term consequences towards the use of instructional technology of TVL educators in their teaching practice. To address this gap, the following methodology was employed.

**Research Design**

To investigate the factors that affected instructional technology use among Technical-Vocational Livelihood (TVL) educators in a state university located in Mindanao, a quantitative research design was employed in this study. The design involved the use of online survey questionnaires to gather data from TVL educators on their perceptions regarding the factors that influence their use of instructional technology. The collected data were analyzed using multiple regression to determine which factor influences the use of instructional technology [12].

**Research Setting**

This study was conducted in a state university located in Cagayan de Oro City in Northern Mindanao Philippines. The institution is located in Misamis Oriental, Philippines, and has multiple campuses scattered across different locations in the region. The University System offered TVL programs in Cagayan de Oro, Claveria, Jasaan, Oroquieta, Panaon, and Balubal campuses. This study is essential to gain insights into enhancing the use of instructional technology among TVL educators in the various USTP campuses.

**Sample of the Study**

This study employed 231 TVL educators. They were purposively chosen based on predetermined criteria. The inclusion criteria were (a) employed as a faculty member, (b) must be teaching TVL courses, (c) and must have been teaching since the onset of COVID-19. Any employee of the above-mentioned state university who does not meet the inclusion criteria is excluded from being chosen as a respondent of the study. Table 1 presents the distribution of the respondents based on their demographic profile

**Research Instrument**

This study employed a survey instrument to evaluate the inclination of TVL educators to adopt instructional technology, utilizing the frameworks of TAM, TPB, and MPCU. Table 2 presents the constructs and their corresponding question items Each item is measured five-point Likert scale. Table 3 presents the Likert scale used in this study and the corresponding description of each scale.

In the research instrument, filtering questions were utilized to select respondents based on predetermined criteria. The filtering questions helped the researcher to identify TVL educators who have relevant experience in using instructional

technology in their teaching practices while excluding those who do not meet the required criteria. This ensured that only qualified respondents participated in the study, thus increasing the accuracy and reliability of the research data.

**Validity and Reliability**

The reliability of the research instrument used in this study was measured using the Cronbach Alpha through the SPSS version 25. As presented in Table 4, the internal consistency of the variables under study has a highest value of 0.923 and a lowest value of 0.722. The reliability values are within the acceptable range [17]. Hence, the variables under study have satisfactorily met the requirements to establish internal consistency.

**Table 1. Distribution of the respondents (n=231)**

| Characteristics | Frequency | Percent |
|---|---|---|
| Age | | |
| Below 25 years old | 30 | 13.0 |
| 26 to 35 years old | 102 | 44.2 |
| 36 to 45 years old | 57 | 24.7 |
| 46 to 55 years old | 28 | 12.1 |
| 56 to 65 years old | 11 | 4.8 |
| Above 65 years old | 3 | 1.3 |
| Sex | | |
| Female | 118 | 51.1 |
| Male | 113 | 48.9 |
| Academic Qualifications | | |
| Bachelor's Degree | 70 | 30.3 |
| On-going Master's Degree | 26 | 11.3 |
| Full-fledged Masters | 97 | 42.0 |
| On-going Doctoral Degree | 3 | 1.3 |
| Full-fledged Doctorate | 32 | 13.9 |
| Post-Doctoral | 3 | 1.3 |
| College | | |
| College of Science and Technology | 134 | 58.0 |
| College of Technology | 29 | 12.6 |
| College of Information Technology and | 18 | 7.8 |
| College and Engineering and | 10 | 4.3 |
| College of Sciences and Mathematics | 14 | 6.1 |
| Senior High School | 18 | 7.8 |
| ICET | 4 | 1.7 |
| College of Arts | 3 | 1.3 |
| College of Agriculture | 1 | 0.4 |
| Teaching Experience | | |
| Less than a year | 60 | 26.0 |
| one to three years | 59 | 25.5 |
| more than three years | 112 | 48.5 |

**Table 2 Number of items from the theories used in this study**

| Theory | Constructs | No. of Items | Source |
|---|---|---|---|
| TAM | PU | 5 | Davis (1989) |
| | PEU | 6 | |
| TAM & TPB | Att | 3 | Ajzen (1991) |
| | BI | 3 | |
| | SN | 3 | |
| TPB | PBC | 3 | |
| | AC | 4 | |
| | JF | 5 | |
| | LTC | 6 | |
| | ATU | 2 | Thompson et al.'s (1994) |
| MPCU | FC | 3 | |
| | C | 4 | |
| | SF | 5 | |

**Table 3. The likert scale used in this study**

| Scale | Description | |
|---|---|---|
| | PU, PEU, AU, JF, LTC, ATU, FC, C, and SC | A, SN, PBC, and BI |
| 1 | Strongly Disagree | Extremely Unlikely |
| 2 | Disagree | Unlikely |
| 3 | Neutral | Neither Likely / Unlikely |
| 4 | Agree | Likely |
| 5 | Strongly Agree | Extremely Likely |

**Data Gathering Procedure**

The data collection for this study was conducted through an online survey, utilizing Google Forms. The survey was distributed via Facebook Messenger and email. Filtering questions were also included in the survey questionnaire to ensure that only eligible respondents participated in the study.

**Table 4. Reliability test using Cronbach alpha**

| Constructs | Cronbach's alpha |
|---|---|
| Actual Use | 0.796 |
| Affect Towards Use | 0.865 |
| Behavioral Intention | 0.790 |
| Facilitating Condition | 0.882 |
| Job Fit | 0.837 |
| Long-Term Consequences | 0.899 |
| Perceived Behavioral Control | 0.922 |
| Perceived Ease of Use | 0.881 |
| Social Factors | 0.923 |
| Perceived Ease of Use | 0.881 |
| Social Factors | 0.923 |
| Subjective Norms | 0.722 |

The researcher sought permission from the university administrators before collecting the data and only proceeded with the data collection after obtaining the necessary permission.

The use of an online survey as a means of data collection proved to be a more efficient and cost-effective approach in the study. Online surveys offer notable benefits for collecting substantial amounts of data within a shorter period, while also providing anonymity to participants, thus improving the chances of their willingness to participate [13]. Moreover, utilizing the online survey allowed the researcher to reach a wider audience, particularly among TVL educators who may be dispersed across different campuses. It also allowed for the collection of data from respondents who may not be easily accessible through traditional modes of data collection, such as face-to-face interviews. The online survey was chosen in this study due to its practicality, efficiency, and ability to reach a wider audience of TVL educators.

**Statistical Data Analysis**

This study employed Multiple Regression in analyzing the data. This statistical analysis determines the degree of influence of the independent variable on the dependent variable. It also identifies the most significant independent variable that explains the variance in instructional technology use among TVL educators. The analysis of quantitative data using multiple regression provided insights into which factors significantly influence technology adoption among TVL educators. This information can help stakeholders, such as policymakers, school administrators, and educators, to develop

strategies for promoting technology adoption in TVL education.

**Ethical Considerations**

The research on the determinants of instructional technology use among TVL educators in a state university in Mindanao prioritized ethical considerations, such as obtaining informed consent, ensuring confidentiality and anonymity, minimizing harm, and avoiding coercion. Such ethical considerations were intended to uphold the participants' autonomy and rights, ensuring confidentiality and anonymity to protect their privacy, minimizing potential harm, and avoiding coercion, the research was conducted with integrity and respect towards the participants' rights and autonomy. To uphold ethical guidelines, the researcher in this study conducted an online survey where the respondents gave their consent before receiving the link to participate. The respondents were informed that their answers would be recorded using Google Forms. The results were kept confidential and stored securely, only to be used for transcription purposes.

## RESULTS AND DISCUSSION

***Statistical Assumptions for Multiple Regression***

Prior to hypothesis testing, statistical assumptions such as normality, homoscedasticity, and linearity were assessed to ensure that the multiple regression analysis [18]. Figure 1 shows that the data of this study satisfies the linearity assumption. In addition, Figure 2 shows that the data are normally distributed. Figure 3 shows that the data of this study satisfied the homoscedasticity assumption.

***Hypothesis Testing***

Multiple regression analysis was used to analyze the data needed to answer the research question of this study. Table 5 shows that the model under study indicates a good level of prediction *(R=0.760)*. In addition, it can also be observed that the predictors explain 38.1% of the reasons why TVL educators use instructional technology in their teaching practice. Moreover, the results of the data analysis revealed that the overall regression is a good model fit for the data. Table 6 presents that the predictors statistically significantly present the actual use of instructional technology among TVL educators under study $F(12, 218) = 11.164, p < .001$. A closer look at the specific predictors that significantly influence TVL educators to use instructional technology in their teaching revealed that PEU *(p<0.001, t=6.699)* is the strongest predictor. This is followed by PU *(p<0.001, t=4.098)*. FC is the third significant predictor *(p<0.012, t=2.522)*, and the last is BI *(p<0.013, t=2.501)*. The rest of the predictors do not significantly influence the actual use of instructional technology among TVL educators.

***T*able 5. ANOVA analysis results**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 10.294 | 12 | 0.858 | 11.164 | .000[b] |
| | Residual | 16.750 | 218 | 0.077 | | |
| | Total | 27.044 | 230 | | | |

a. Dependent Variable: Actual Use

a. Predictors: (Constant), SF, ATU, Complexity, PEU, PBC, PU, FC, SN, LTC, Attitude, JF, BI

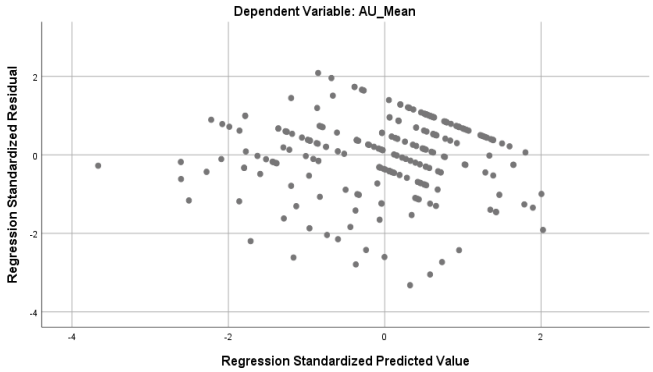


**Figure 1: Normal P-P Plot of Regression showing the linearity of the data**

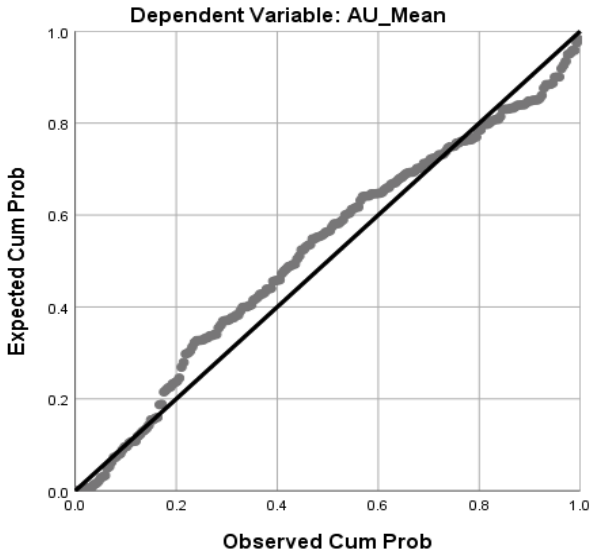


**Figure 2: Normal P-P Plot of Regression showing normal distribution of the data**

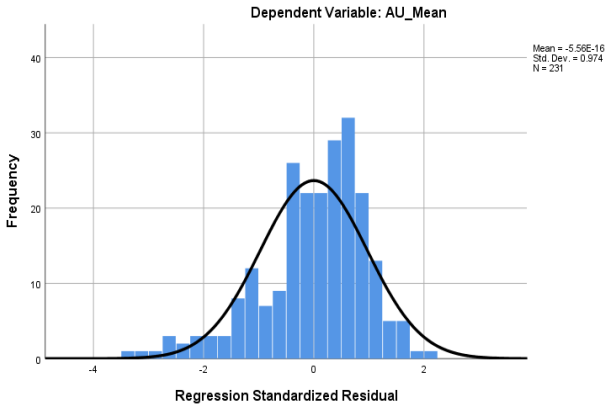


**Figure 3: Scatterplot of Regression showing heteroscedasticity of data**

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**Table 6. Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $R^2$ Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .617[a] | 0.381 | 0.347 | 0.27719 | 0.381 | 11.164 | 12 | 218 | 0.000 | 1.214 |

a. Predictors: (Constant), SF, ATU, Complexity, PEU, PBC, PU, FC, SN, LTC, Attitude, JF, BI

b. Dependent Variable: AU

**Table 7. Regression analysis**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | | 95.0% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t-value | p-value | Lower Limit | Upper Limit |
| 1 | (Constant) | 2.379 | 0.327 | | 7.284 | 0.000 | 1.735 | 3.023 |
| | **Perceived Ease of Use** | 0.452 | 0.067 | 0.442 | **6.699** | **0.000** | 0.319 | 0.585 |
| | **Perceived Usefulness** | 0.23 | 0.056 | 0.324 | **4.098** | **0.000** | -0.341 | -0.12 |
| | **Facilitating Condition** | -0.079 | 0.031 | 0.174 | **2.522** | **0.012** | -0.14 | -0.017 |
| | **Behavioral Intention** | 0.189 | 0.076 | 0.251 | **2.501** | **0.013** | 0.04 | 0.338 |
| | Social Factor | 0.075 | 0.042 | 0.131 | 1.77 | 0.078 | -0.008 | 0.158 |
| | Job Fit | 0.094 | 0.065 | 0.142 | 1.446 | 0.15 | -0.034 | 0.221 |
| | Long-Term Consequences | 0.059 | 0.051 | 0.093 | 1.143 | 0.254 | -0.043 | 0.16 |
| | Attitude | 0.04 | 0.058 | 0.056 | 0.685 | 0.494 | -0.074 | 0.154 |
| | Perceived Behavioral Control | 0.004 | 0.053 | 0.006 | 0.081 | 0.936 | -0.1 | 0.109 |
| | Subjective Norms | -0.044 | 0.062 | -0.06 | -0.708 | 0.48 | -0.165 | 0.078 |
| | Affect Towards Use | -0.043 | 0.033 | -0.072 | -1.319 | 0.188 | -0.107 | 0.021 |
| | Complexity | -0.031 | 0.019 | -0.096 | -1.688 | 0.093 | -0.068 | 0.005 |

a. Dependent Variable: Actual Use (AU)

## CONCLUSION

This study highlights the significant determinants that influence the use of instructional technology by TVL educators in Philippine universities during the COVID-19 pandemic. It is worth noting that in Namoco's study [11] which was conducted prior to the onset of the Covid-19 pandemic, it was found that performance expectancy, effort expectancy, behavioral intention, and facilitating conditions were significant predictors of technology usage. Interestingly, in this study which was conducted during the onset of the COVID-19 pandemic that uses the online modality, the perceived ease of use, perceived usefulness, facilitating conditions, and behavioral intention are also found to be significant determinants to the use of instructional technology.

Based on the findings of this study, it can be concluded, that regardless of the learning environment setting, whether online or in-person, TVL educators will use instructional technology in their teaching practice if it is easy to use, enhances their teaching practice, and is readily available. The study also revealed that even when technology is necessary due to online learning, educators are unlikely to use it if the application is complicated and difficult to navigate. It is essential for application designers to consider this factor, especially since some instructional technology users are classified as millennials or digital immigrants. The aforementioned designers are encouraged to strive in order to make their applications as user-friendly as possible.

## RECOMMENDATION

This study recommends that educational institutions may provide support and resources to TVL educators in the use of instructional technology. This can be achieved through training programs, workshops, and access to technology resources. Additionally, educational institutions may also promote a culture of technology use and encourage behavioral intention among TVL educators to effectively integrate technology into their teaching practice. By addressing these determinants and promoting technology utilization in education, institutions may improve student learning outcomes and adapt to the changing educational landscape amidst the COVID-19 pandemic.

In the context of TVL educators during the COVID-19 pandemic, perceived ease of use is the most significant factor in determining the adoption of instructional technology. This finding is interesting because it is contrary to the impact of complexity, which tends to inhibit the adoption and effective use of technology. When instructional technology is perceived as easy to use, it becomes more appealing to educators, and they are more likely to integrate it into their teaching practices. On the other hand, if the technology is perceived as complex or difficult to use, educators are less likely to use it and may struggle to use it effectively. Therefore, perceived ease of use is a crucial factor that can positively influence the adoption and effective use of instructional technology among TVL educators during the COVID-19 pandemic. Also, it is recommended that a qualitative study be conducted to understand in-depth the experiences of TVL educators when they use instructional technology in their teaching practice.

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