

Development of Digital Platforms for Information Exchange and Increase of Teaching Tools for the Strengthening of Educational Programs

Manuel Baro¹, Ricardo Espino González²

¹ Research Professor, Institute of Engineering and Technology, Tecnológico Nacional de México Campus Nuevo Casas Grandes, Chihuahua, México

² ¹ Research Professor, at the Centro de Estudios Tecnológicos industrial y de servicios número 93 perteneciente a la DGETI.

ABSTRACT

Pedagogical mediations are characterized by a set of interventions, resources, and materials, which as an articulated system intervene in the educational process, facilitating it. On the other hand, for several years the educational process using educational technology serves as support to increase the effectiveness of the teacher's work. Among the objectives of the new Mexican school, the incorporation of content to the advancement of humanity, science, technology, innovation, and competency-based training is indicated. Likewise, collaborative work is attributed to teaching skills to socialize the best proposals on training in different areas of knowledge, and the exchange of resources generating networks. As an objective of this research, a platform was developed that serves as a repository made up of materials and media developed and proposed by teachers belonging to the same academy at the national level.

Keyword *qualitative analysis, computer application, communication, competency, competence.*

Introduction

Pedagogical mediations, characterized by the set of actions or interventions, resources, and didactic materials, as an articulated system of components that intervene in the educational act (Nafisa Saidnazarovna, 2021), facilitating the teaching and learning process, have the objective of facilitating intercommunication between the student and the advisers or teachers to favor, through reasoning, a comprehensive approach of ideas and knowledge (Davila et al., 2021). Teaching media and learning resources, for many years and more recently educational technology, have served as support to increase the effectiveness of the teacher's work (Xue & Churchill, 2022).

The New Mexican School (NEM), indicates among its objectives, relating its content to advancements in humankind, science, technology, and pedagogical and didactic innovations of learning-based instruction and labor-based training (Shkola, 2022).

The term "academy" refers to a college organization that unites academic staff members who teach at various levels of education and conduct academic management, linking, and research activities (Iqbal, 2020).

Both the NEM and the Secretary of Public Education (SEP) indicate teaching competencies such as willingness to work collaboratively, openness to criticism, and feedback, among other aspects, cooperation between institutions at the national level, to socialize the best proposals. on training in the different areas of knowledge, and the exchange of resources generating networks that promote teacher development and the capacity for innovation (Chin-Hua & Ming-Chang, 2021); to provide, from the technological field, an immediate information tool, with reliable elements and distribution among the national academies that are formed in the General Directorate of Industrial Technological Education and Services (DGETI), AppCademia was developed. An application that serves as a repository made up of the materials and media developed and proposed by teachers belonging to the same academy at the national level.

Research Model Formulation

Utilizing the national educational requirements as a foundation. The project's development strategy will take the following steps:

1. Planning: A virtual meeting with the teaching staff at the SMEC academy to discuss the project's needs, goals, and scope.
2. Requirements analysis: Identifying the platform's structural, security, and associated business processes, as well as its functional and non-functional needs.
3. Database design: The definition of the tables, relations, and restrictions as well as the creation of a conceptual and logical model of the database.
4. Implementation: Construction of the database, including the writing of scripts, integration with the front-end, and functionality testing, as well as its integration with the web system.
5. Testing: Carrying out unit and integration tests to confirm that the database is operational and complies with the specifications.
6. Describe: Setting up and configuring the database in the production environment and transferring data from the development environment.
7. Presentation of the proposal: The National Academy members are given a presentation of the platform, which is followed by the inclusion of resources.
8. Maintenance: Carrying out maintenance procedures to make sure the database is current and operating correctly, including bug repairs and functionality upgrades.

Each step of the project took one year to complete, starting from the day the proposal was turned in.

Appsheet is a cloud application platform that enables users to design, develop, and operate apps, which was utilized for the platform's development (Liu et al., 2022). Also, it gives you the ability to build and save data in your cloud database and to link to many data sources, like Microsoft Excel and Google Sheets, among others (Petrović et al., 2020). The following are a few benefits of this digital tool:

- Accessibility: Makes it simple to build mobile and online applications.
- Data Integration - Makes it simple to combine data from many sources, such as spreadsheets, cloud databases, and other web applications.
- Customization: Provides several choices for customization to meet the individual demands of each user.
- Collaboration - Enables users to share information, work together on application development, and collaborate in real-time.
- Scalability: Enables programs to expand and modify as user needs alter.
- Access from anywhere: enables users to access software and data at any time and from any location via an Internet connection.
- Time and money savings enables you to rapidly and cheaply construct mobile and web applications without spending money on developers or complicated technology.
- Examination of the context and the objectives: decision about the study's goals and the environment in which it will be conducted.
- Information selection: Identifying and choosing the most pertinent information sources for the study.
- Information coding and classification: The organization and classification of the gathered data to aid in its analysis.
- Information analysis: assessing and analyzing information critically, finding patterns and trends.
- Information synthesis: Combining the information that has been studied into a comprehensive and cohesive picture.

The Systems Prototype Technique

1. Identification of known requirements: Information from the academy minutes, which include needs and requests,

was evaluated. Information was subsequently confirmed at the national conference (Gummin et al., 2022).

2. The creation of a working model. The prototype construction process started with the creation of a general plan that allowed users to understand what was required of them and the development process (Mouchaers et al., 2023). The plan was presented before the academy, where the national president was chosen.

3. Making use of the prototype: Participants were invited to use the prototype, and assess its features, and operation (Unciti & Palau, 2023). The system's performance under actual circumstances allowed for the identification of both the deficiencies and the required alterations and enhancements.

Evaluation of the Prototype

Information on the preferences of the users was gathered during the evaluation of the advisers.

Carrying out the procedure as many times as required the procedure is repeated multiple times until coming to a finish when the writers and consultants determine that the prototype has developed sufficiently to contain all essential features.

The primary tasks that were developed at each stage of the project were the design of the platform, the creation of the database design and linking the data obtained through the programming of the Appsheet for the concentration and management of data, the validation of the project as a response to the identified needs and their applicability, followed by the application of functional tests to the prototype, which led to corrections, and finally with the formalization of the project (See figure 1).

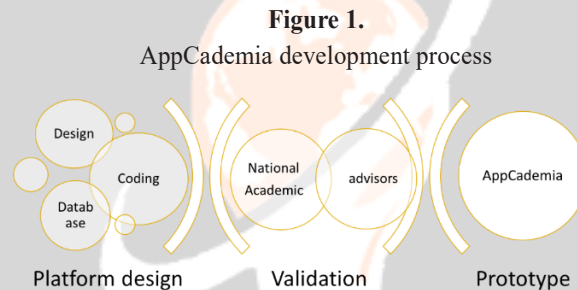


Figure 1. AppCademia development process

VALUE PROPOSAL

This prototype was created for quick deployment due to its technological nature. Its goal is to address the unique demands of the Computer Equipment Support and Maintenance school, but it may be modified to meet the needs of other academies, such as a bespoke product. Due to its frequently updated and important content for the specialties, it is housed in a type of cutting-edge platform that will have a significant impact on the teaching activities to replicate and enhance strategies, practices, and different didactic materials created by users themselves around the globe. Its added feature is that it is made to be used both in browser mode and as a mobile application (app), allowing access and getting notifications whenever users will always be up to date with fresh information since new content is created periodically in the different parts. There isn't already a platform in the educational spectrum that offers these advantages because none has been specifically created for users and is adaptable to others.

Viability study

This prototype was designed with the requirements specified by the members of the National Academy of Support and Maintenance of Computer Equipment, which ensures the use of the platform, being them, as users, the ones who will validate the functionality and provide information for its improvement. And maintenance. Giving the authors the ability to finish satisfactorily and deliver the expected results, continuing with the initiative to extend the project to other academies nationwide.

Technical and Financial Feasibility Study

Given that this software is intended for use in schools and that its creators are educators, teachers could use network resources without paying for them or with unrestricted access for a specified period, allowing for the presentation of the software to the appropriate authorities (Innovating Education and Educating for Innovation, 2016). trying to give a spot on the official servers eventually. The primary goal of this prototype, which was created by teachers for teachers, is to promote peer cooperation. It will be given to the authorities after receiving the instructor's approval so that the DGETI may pay the running expenses.

Tools designed for educational usage and open-source developers were used for the data connection and analysis because they are free and would not add to the expense of using this software, in addition to offering portability, security, compatibility, and mobile development, these utilities may be made available to all schools (Dwivedi et al., 2022).

Results and Discussion

Data are categorized, arranged, changed, and summarized during analysis to respond to research objectives (Li, 2023). The goal of the analysis is to make the data more comprehensible and interpretable so that the linkages between the research problems may be examined and evaluated (Stetsenko, 2023). The results of the analysis are then used to develop conclusions about the relationships that have been researched in the study. The quantitative analysis of the data gathered with the electronic tool applied to instructors, which is shown in a side menu and yields the results of usage and participation by state (Abdulrahman et al., 2020), is the focus of the examination of the use of the digital platform. The system's functionality is currently available after it was applied to a sample of 16 state academy presidents, with a total of 69 schools with the specialty of SMEC across the nation, from which a database was obtained, and the analysis of their results expressed in digital material used by the SMEC specialty academy. Examples of linkages for other academies have been provided, along with a connection to transversal topics, as a demonstration of the potential reach of this platform's application.

Conclusion

Based on an assessment of the requirements of each academy it will be tailored to and provide access to all instructors, it is considered that there is a high degree of practicality for the deployment of AppCademia in all upper secondary schools. This work is made simple and quick at the national level by the strengthening of rapid access to resources and methods. What assesses if the premise put forth is tenable using this user-friendly program? This is based on the knowledge gained and data gathered from studies on the use and implementation of educational platforms, the professionalization of its authors, and the positive reception of teachers during the test application periods, which lasted an average of 6 months for a roughly 69-school population.

References

- [1] Abdulrahman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. In *Heliyon* (Vol. 6, Issue 11). Elsevier Ltd. <https://doi.org/10.1016/j.heliyon.2020.e05312>
- [2] Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., ... Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66. <https://doi.org/10.1016/j.ijinfomgt.2022.102542>
- [3] Gummin, D. D., Mowry, J. B., Beuhler, M. C., Spyker, D. A., Rivers, L. J., Feldman, R., Brown, K., Nathaniel, P. T. P., Bronstein, A. C., & Weber, J. A. (2022). 2021 Annual Report of the National Poison Data System[®] (NPDS) from America's Poison Centers: 39th Annual Report. *Clinical Toxicology*, 60(12), 1381–1643. <https://doi.org/10.1080/15563650.2022.2132768>
- [4] *Innovating Education and Educating for Innovation*. (2016). <https://doi.org/10.1787/9789264265097-en>

- Li, P. (2023). Research on Business Model Innovation based on Big Data Analysis in Internet Plus. *Highlights in Business, Economics and Management*, 3, 282–287. <https://doi.org/10.54097/hbem.v3i.4794>
- [5] Mouchaers, I., Verbeek, H., Kempen, G. I. J. M., van Haastregt, J. C. M., Vlaeyen, E., Goderis, G., & Metzelthin, S. F. (2023). Development and content of a community-based reablement programme (I-MANAGE): a co-creation study. *BMJ Open*, 13(8), e070890. <https://doi.org/10.1136/bmjopen-2022-070890>
- [6] Stetsenko, D. (2023). Labyrinth Using a Machine Learning Algorithm. *Bunyck, March*. <https://doi.org/10.32782/tps2663-4880/2022.26.2.19>
- [7] Unciti, O., & Palau, R. (2023). Teacher decision making tool: Development of a prototype to facilitate teacher decision making in the classroom. *Journal of Technology and Science Education*, 13(3), 740. <https://doi.org/10.3926/jotse.1801>
- [8] Chin-Hua, H., & Ming-Chang, H. (2021). Network Position and Innovation Outcomes: The Moderating Role of Knowledge Diversity. *Journal of Management and Business Research*, 38(3), 313–341. [https://doi.org/10.6504/JMBR.202109_38\(3\).0001](https://doi.org/10.6504/JMBR.202109_38(3).0001)
- [9] Davila, D., Barba, C., Peñaherrera, K., Espinel, C., & Meza, M. C. (2021). The weaknesses in the didactic material of the Ecuadorian educational system, allow the integration of design, innovation, and creativity. *Minerva*, 2(6), 58–69. <https://doi.org/10.47460/minerva.v2i6.43>
- [10] Iqbal, Z. (2020). Evidence-based teaching practices: A road less traveled in Pakistan? *Health Professions Educator Journal*, 3(2), 7–8. <https://doi.org/10.53708/hpej.v3i2.1036>
- [11] Li, P. (2023). Research on Business Model Innovation based on Big Data Analysis in Internet Plus. *Highlights in Business, Economics and Management*, 3, 282–287. <https://doi.org/10.54097/hbem.v3i.4794>
- [12] Liu, S., La, H., Willms, A., & Rhodes, R. E. (2022). A “No-Code” App Design Platform for Mobile Health Research: Development and Usability Study. *JMIR Formative Research*, 6(8). <https://doi.org/10.2196/38737>
- [13] Nafisa Saidnazarovna, Y. (2021). Improving the Didactic System of Use of Historical, Scientific and Pedagogical Values of Great Images in Higher Educational Institutions. *Psychology and Education Journal*, 58(1), 2072–2081. <https://doi.org/10.17762/pae.v58i1.1084>
- [14] Petrović, N., Radenković, M., & Nejković, V. (2020). Data-Driven Mobile Applications Based on AppSheet as Support in COVID-19 Crisis. *Icetran 2020*, September, 1–6.
- [15] Shkola, I. (2022). Interactive Lectures As a Way To Increase the Effectiveness of Teaching and Learning in Higher Educational Establishments. *Scientific Papers of Berdiansk State Pedagogical University Series Pedagogical Sciences*, 1(1), 436–444. <https://doi.org/10.31494/2412-9208-2022-1-1-436-444> tetsenko, D. (2023).
- [16] Labyrinth Using a Machine Learning Algorithm. *Bunyck, March*. <https://doi.org/10.32782/tps2663-4880/2022.26.2.19>
- [17] Xue, S., & Churchill, D. (2022). Educational affordances of mobile social media for language teaching and learning: a Chinese teacher’s perspective. *Computer Assisted Language Learning*, 35(4), 918–947. <https://doi.org/10.1080/09588221.2020.1765811>