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SSENPV's Integrated Management Platform

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Abstract

At the Polytechnic of Viseu (PV) [1], the number of students has been increasing [2], and it is hoped that this trend continues, for the sake of the literacy of the population that serves in its area of coverage and for the reduction of the desertification of the interior region in which is inserted. In the case of Students with Specific Educational Needs (SSEN) who attend the PV (SSENPV), it is extremely important to develop procedures that minimize the anxiety brought about by change for these students, as well as to facilitate their adaptation, to make the period of permanence in Higher Education (HE) an inclusive period, generating well-being, promoting academic success, and facilitating the transition to active life. To combat this phenomenon and since the PV is a Higher Education Institution (HEI) that is guided by equity in its community, in particular the student community, the SSENPV census is a crucial measure insofar as it is necessary to implement procedures, which must respect and obey individual specificities. It is also intended that, regarding access to information on the platform, it will allow reducing asymmetries between students as well as access to services.

To respond to this reality, within the scope of the Inova & Includes project. IPV I2 [3], a group of researchers, in partnership with the degree course in Computer Engineering at the Superior School of Technology and Management of Viseu (ESTGV) – curricular unit of “Project”, developed an integrated management platform for SSENPV. This platform, which is intended to be a contribution to true equity in education in the PV, is based on the support of social impact in different dimensions, which translates into the implementation of the following profiles:

- Informative Profile: dissemination of legislation and other relevant information on Specific Educational Needs (SEN), ensuring centralized and accessible information management and streamlining procedures and support measures.
- Academic Profile: registration and updating of data on the SSENPV.
- Technical Evaluation and Follow-up Profile: registration of the SSENPV procedural evaluation, with automatic sending of technical evaluations to authorized users.

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1. Introduction

The PV is committed to defending and promoting the fundamental principles that repudiate any form of discrimination in the multiple dimensions of the diversity that constitutes the academic community. In this context, the SSENPV are included. Within the scope of the project [3], the opportunity arose to implement a platform that, in an integrated and transversal way to the institution, will allow the management of SSENPV's academic path.

IPV Equitable [4], one of the activities of the project [3], included the creation of the IPV Equitable (PIPVE) platform [5]. Currently, the PV's response capacity regarding monitoring the SSENPV is unsatisfactory, in addition to not being transversal to the Organic Units (OU) that constitute it. The lack of a computerized system hinders the efficient and effective follow-up of the SSENPV. The platform automates the entire SSENPV process, in an expeditious and easy-to-use manner, and will be accessible to those involved in the SSENPV integration and inclusion process, streamlining procedures, measures, support and other needs.

Moreover, since SEN is due to physical or mental limitations, metabolic problems, concentration problems, chronic diseases, among others, and covers children, adolescents and even adults, making their academic career difficult, the platform can be replicated or adapted by other institutions. Considering that the aforementioned factors generate the stigma of social plurality and “non-inclusion”, it is urgent to find and implement solutions that promote and guarantee societal equity.

In addition, the platform will mitigate SSENPV's fear of requesting support. In other words, in a first “stage” and until a relationship of trust is established, there will be no direct or social contact with the agents that support SSENPV, a reality that usually discourages the search for assistance. As mentioned, it is intended to expand the platform so that it can be used/replicated/adapted by other institutions. For this, the platform is dynamic, allowing high customization and avoiding code changes. Finally, it is important to mention the implementation of tutorials that illustrate how it works, helps SSENPV navigate and fill in the forms. About other users, additional training guides within the scope of SEN are also available.

2. Related Work

PV, as an HEI that prioritizes academic equity, will be innovative once it will be the first HEI to implement a platform with the characteristics previously described. Through research carried out by other HEIs, platforms were analysed that, in some way, address the theme and provide some kind of support, however PIPVE is a reality unavailable in the Portuguese HEIs.

2.1 Online platform of support to ICTRC network – “SEN network”

The SEN Network [6] is a platform developed by the University of Aveiro. The purpose of the SEN Network is to establish a network of contacts between the different ICT Resource Centres for Special Education (ICTRC). This network would facilitate communication between the various stakeholders, allowing a request for support, anywhere in the country, to be automatically forwarded to the ICTRC in its area of coverage [6, p. 4]. Three types of target user are pre-defined, the visitor - who can only access public information, the registered user, and the administrators. It will be possible to make requests for support through a form that is subsequently evaluated by the administrators. Another advantage obtained by centralizing procedures using the online platform is the flow of communication between stakeholders. Since the tool developed makes it possible, from the moment the evaluation request is made, to consult the status of the process, as well as the exchange of messages between the interested parties [6, p. 21:22]

As mentioned, the SEN Network has a very similar objective to PIPVE, but in addition to not approaching it in a similar way, some inconsistencies were detected. Starting with the users system, there are only three profiles, which leads to a security flaw, as any user with any privilege is defined as an administrator. This situation grants access to functionalities that, on the one hand, may not be of any interest to the user, on the other hand, by mistake or intentionally, may cause damage to the platform [6, p. 22]. Access to personal data that is not very restricted is also not safeguarded. However, the ICTRC centres are defined by geographic areas, which leads to the belief that an area treats all students from different schools. This situation, in addition to causing entropy, does not differentiate the level/categorization of access of monitoring agents, consequently all registered information and personal data is

accessible to all those [6, p. 21]. PIPVE was designed considering the association of users to the respective OU/Service, as well as the parameterization of levels and categorization of access to information.

Considering the pages of the SEN Network, they were prepared with high accuracy and efficiency. Pages with legislative information, questions and answers, terms, and conditions, among others, are available. It is only observed that the page relating to the legislation is not a reference to the operation of the mechanism. From the analysis carried out, it can be deduced that it is static, that is, the information on the page is fixed and, possibly, changed manually [6, p. 24]. In the case of PIPVE, a blog was created with an informative profile, which has access to the tools for publishing articles. In this way, it is possible to share legislation, events, and other relevant information.

Another particularity that is considered a disadvantage of this platform is the need for the psychopedagogical reports to be produced manually. That is, the information contained in the platform must be rewritten on the report page by the agent accompanying the SSEN [6, p. 28]. The platform does not emphasize the export of information and automation of procedures. As will be seen below, PIPVE guarantees this functionality.

Finally, a key element of the platform, the Request for Support (RFS) form. In the form included in the SEN NETWORK, which is very well prepared regarding the required information [6, Fig. 11], it is observed that it could be technically more elaborate. For example, there are different entries placed on the same page which makes it very large and confusing. There is also no section available where the SSEN can register “its adaptations”, for example the use of a computer in the assessment tests. Although it seems like a minor detail, in terms of approval/rejection and operationalization of personalized measures, it has a relevant impact. PIPVE's RFS contemplates the “gaps”, allowing the responsible agent to prioritize the pertinence of the measure and eventual referral to the decision-making body, namely Scientific Technical Council, Pedagogical Council, Department Director, Administrative Services, &c.

2.2 Places – Accessibility platform

The Places platform was developed by the University of Porto [7] with the aim of overcoming the difficulties experienced by different SSEN, about access to information. This platform is described as a space for sharing tutorials that, in a simple and practical way, in video or text format, it helps teachers to create information adapted to SSEN.

Consulting Places allowed us to verify that the respective design is outdated and not very responsive, however the functionality of the tutorials was an inspiration in the development of PIPVE. Initially, a page of guides was idealized, more focused on the use of the platform itself [8].

2.3 UALg – Student with SEN

The University of Algarve (UALg) [9] also provides a support request version. In this institution, a dedicated platform was not created for this purpose. SSEN has access to a RFS form like the one available at PIPVE. The form provided by UALg also contains details that can be optimized [10], it appears to be confusing and has an unappealing design. Another feature that could be improved is the organization of the required information. It should be noted that it “has a mix” of English and Portuguese and excessive text. PIPVE's constant RFS is structured and subdivided into categories, which clarifies and facilitates its understanding and completion. In addition to the mentioned, the data filled in in a session is stored, avoiding duplication of “completion” if the session is interrupted. Another important feature that PIPVE provides is related to the possibility for agents to dynamically add new records of the form, without changing the code.

3. Architecture

For the construction of PIPVE, all the requirements requested by the client were considered, incorporating new ideas that emerged. To this extent, the possibility of introducing changes has always been underlying, so PIPVE was designed so that any change and introduction of new components would be easy to implement. This structural principle remains implicit in PIPVE as it is a dynamic platform.

Next, the main aspects and challenges in the development of PIPVE are exposed - development of a web application using HTML, CSS, JavaScript and PHP [11]. It should be noted that the PHP language is not part of the curriculum plan of the degree course in Computer Engineering, which also constituted an additional challenge.

3.1. Framework

For the development of PIPVE, it was decided to create a framework according to the MVC (Model-View-Controller) pattern. In the context of MVC, the “Model” represents the immutable essence of the application, providing support through a set of classes. The “Views”, on the other hand, create a series of windows for the “Model”, being responsible for rendering the model data to the client. The “Controller” acts as an intermediary between the “Model” and the “View”, working as a data input and output channel. User data are received through the “View”, which processes them according to the logic of the “Model” and returns the data to the “View” [12].

In this context, a mechanism to manage routes was also developed. The main objective is to allow the analysis of the type of route requested and the data transmitted within it. For example, in a GET request, the goal is just to get data. Therefore, this request must be processed according to this principle, not accepting data sent by the request body. In addition, this class also examines the middleware that is passed in the route. For example, for the "page/profile" route, a middleware is needed that validates whether the user has started a session.

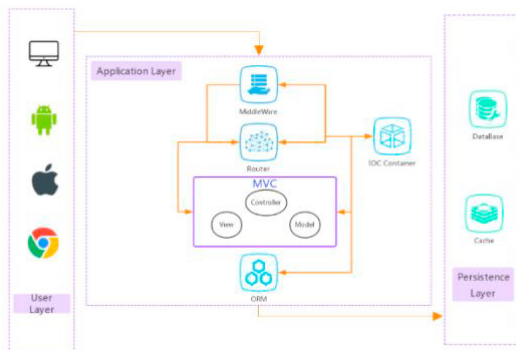


Figure 1 - Route processing

For better understanding, Figure 1 illustrates the concept. The purpose is to filter HTTP requests from the client before they are processed. Only when the middleware allows the packet to pass does the request reach the route. It then moves to MVC, ensuring greater security [13, p. 3].

4. Results and Analysis

4.1. Project requirements

The RFS form was designed to be simple and clear for any Student User with Specific Educational Needs (SUSEN). In this way, it includes indentations, making the text more organized, and tooltips that allow you to obtain additional information about a given field. The entire layout was designed so that it can be changed, that is, it remains responsive and clear, even if fields are added or removed by the Specialized Technical Follow-up User (STFU).

Figure 2 - Request for information from the RFS applicant

The first page (Figure 2) of the form defines the applicant for the RFS. Several possibilities are foreseen: SSENPV, a course coordinator, parents, teachers, technicians, &c. You are guaranteed to select only one option.

On the next page, personal data are registered. Then the mandatory fields are validated, so that it is possible to move on to the next section. The type of support intended, previous and/or current support and, finally, the purpose of the RFS is also requested.

4.2 Backoffice: Notification system

The notifications were developed considering, mainly, the STFU. In this way, it is avoided that those are forced to “open” all the RFS for consultation of updates/changes and verification of new RFS. The notification alerts the STFU to this reality. Note that currently, only notifications are enabled for new RFSs. At any time, all those mentioned and others that are considered important can be activated. All notifications are stored in the database and associated with the USSEN and, in the case of a new RFS and its content, STFUs are notified.

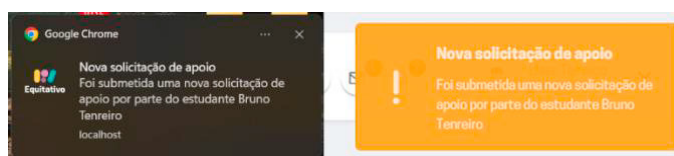


Figure 3 – Types of notification by widget

When a notification is sent, it can be viewed in two ways: in case browser notifications for the platform are active, the message appears directly in the device's notification centre, accompanied by an alert sound; if they are blocked, they appear in the browser itself, on the platform, as can be seen in the image on the right in Figure 3.

4.3 Backoffice: Session system

The implementation of the session system represented a significant challenge for PIPVE. To fully understand the technical/administrative process, it was necessary to hold several meetings with the responsible departments. This allowed not only an in-depth understanding of the process, but also the opportunity to share ideas and thus simplify and make the system more intuitive.

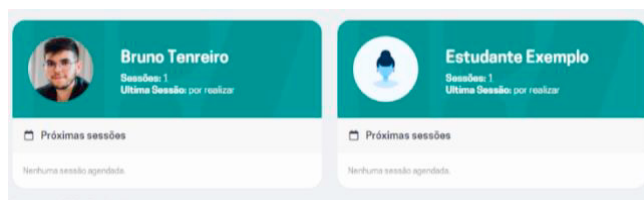


Figure 4 – List of sessions generated for one student.

On the sessions page (Figure 4) there is a list of sessions created by the STFU that has the session started. In this way you will be able to manage “your” USSEN more easily. Each card consists of an image, name, number of tabs created, the date of the last session held and the list of scheduled sessions. This page displays six cards at a time, organized based on scheduled tabs date.

When adding a new session, USSEN is selected with respect to the RFS and, in the lower selection box, all your RFSs are listed. Selecting one displays it on the right, allowing STFU to validate a session for the correct order. Once a session has been generated, pressing the respective card gives access to the details. Tabs can be generated, basically scheduling meetings depending on the availability of USSEN and STFU.

When adding a separator, you are prompted for the reason, date, and start and end time of the meeting. All information entered is validated before adding the separator, avoiding overlapping schedules. Whenever, within the scope of scheduling, a separator is generated, changed, or cancelled, USSEN is automatically notified by email. This process prevents access to the platform just for validation. After generating a session, pressing the respective card

(Figure 4) accesses the details. Tabs can be generated, which basically are meeting schedules depending on the availability of USSEN and STFU.

When the created tab is pressed, its status can be changed, changing it to scheduled (default value), completed or cancelled. Similarly, in case of going from cancelled to scheduled or vice versa, USSEN is automatically notified by email. In addition to the above, there are two additional features: the possibility of inserting a description - session summary, and the possibility of uploading files, which are associated with the tab, thus ensuring better organization.

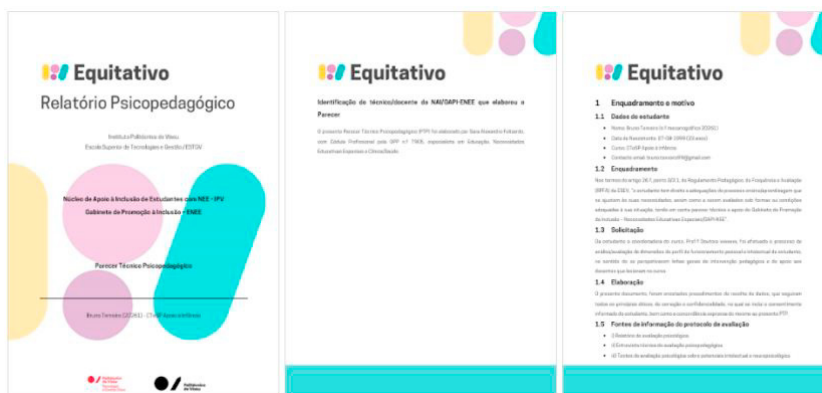


Figure 5 - Excerpt from the psychopedagogical report sample

Another functionality of the platform is the possibility of filling in some fields and later export a report in WORD format (Figure 5), that is, at the end of the five sessions, the STFU can export the psychopedagogical report. It summarizes the descriptions of the tabs, incorporates some data from the USSEN and other information, automatically formatted and filled in. Since all report data is taken from the platform, the work of the STFU is facilitated.

4.4 Backoffice: Calendar

The implementation of the calendar is another feature that aims to facilitate the work of the STFU. On this page, the STFU can manage all the tabs, check which blocks are occupied and view the monthly, weekly, or daily calendar. To create a separator, simply drag the time slot to be booked with the mouse. Automatically, the system asks the STFU to select the reason and the session to which it wants to associate the separator. However, this is not the only function of the calendar, because through it, the tabs can be changed. For example, using the mouse it is possible to expand or reduce a reservation, drag the separator, and change the day or time interval. To remove a separator just press it. All these operations automatically alert the USSEN.

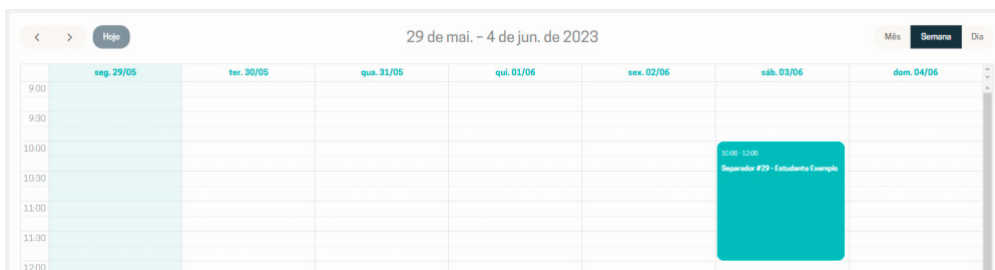


Figure 6 – Page of the calendar

4.5 Backoffice: Conversations

Currently, the PV's response capacity about monitoring the SSENPV, in addition to not being transversal to the OUs that constitute it, is unsatisfactory. Specialized technicians assist SSEN who attend their OU. It should be noted that not all OUs include specialized resources within the scope of SEN in their staff. The platform is a tool that is characterized by its transversality in the SSENPV universe, and whose objective is the centralized management of the processes. For this reason, any SSENPV may resort to the RFS and be accompanied in its particularities. Now, considering that the platform guarantees that all “conversations” are monitored and answered by the STFU, it will be the guarantee of true inclusion and equity in the PV.

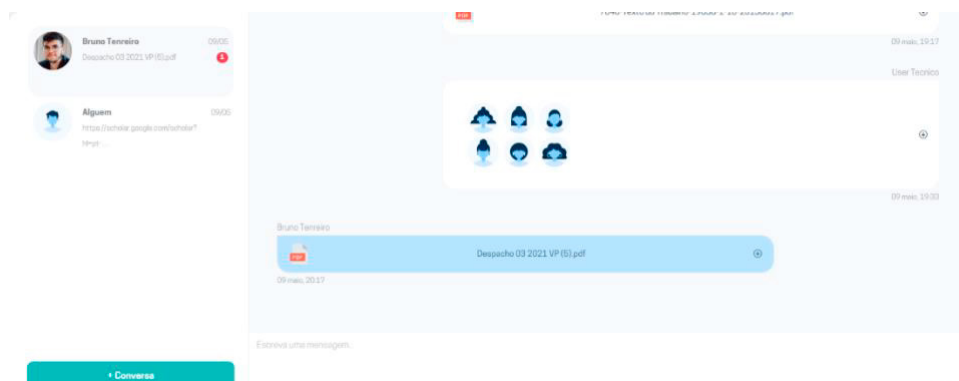


Figure 7 – Page of conversations of a technical user

The left side of Figure 7 exemplifies a list of open conversations. The red ball indicates the number of unread messages. At the bottom, there is a button that allows you to open new conversations with USSEN. Now, the platform is parameterized so that only STFU can “open new conversations”, preventing the USSEN from starting a conversation with a STFU that is not managing its RFS and preventing excessive spam. Through the conversation it can be sent normal text messages and documents. For security reasons, the documents comply with requirements related to length and size. To download documents just press on them.

5 Conclusions and Future Work

“In hindsight, it can be said that the inclusion of SSEN in HE is still in its infancy, so much remains to be done. A justification may be the priority of government policies to prioritize structured, robust, and quality compulsory education. But, on the assumption that the entire educational system must promote and apply inclusive policies, and in a context of almost non-existent government support for HEIs, these institutions challenge themselves in implementing inclusive responses. In other words, the HEI are “mandated” to, with the “tools they have at hand” articulate and coordinate the process that pays for inclusion.” [14].

As can be concluded, PIPVE's main objective is to promote inclusion and support for SSENPV. Through the platform, it is intended to centralize and facilitate the management of SSENPV, as well as streamline procedures and support measures. In addition, the platform seeks to reduce asymmetries between PV students, by providing clear, intuitive, and easy access to available services and transversality in the institution.

Through the informative profile, PIPVE disseminates legislation and other pertinent information about SEN. The academic profile allows the recording and updating of data on the SSENPV, while the technical evaluation and follow-up profile allows the recording of the procedural evaluation and follow-up of these students. PIPVE is based on the functionality, automatism, and speed of the management of the SSENPV process, from the registration of the RFS to the automatic sending of technical opinions to the “authorized assets”.

In short, PIPVE's objective is, unequivocally, to contribute to increasing knowledge and acceptance of difference, self-esteem and personal appreciation, academic proficiency, and the capacity for autonomous and informed decision-

making. Consequently, enable and automate the SSEN to enter active life and make the principle of Equity in PV a reality.

Although all requested requirements have been fully complied with, there is always the possibility of doing more, sometimes by incorporating functionalities, sometimes by replacing more intuitive procedures that time and experience are responsible for revealing. In this context, the functionalities below stand out, which will be an added value for PIPVE users:

- Interconnection of the platform with the PV Application Programming Interface (API) to be able to use its authentication system and collect student information in an automated way.
- Implementation of measures from RCM n.º 41/2018: Soon, it is necessary to ensure the implementation of all other guidelines disregarded in the platform [15].

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