Incident Management that Integrates a Chatbot to Improve the use of Online Education Services

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Introduction

- In the context of the COVID-19 pandemic, we can identify that all the actions of education and training for students have changed radically.
- Everything had to move from the physical environment to the online environment.
- The move of the educational activities in the online environment has brought with it a series of changes for which there was no prior preparation, therefore, the online learning system has gone through a process of digital transformation and continuous improvement during this period as well.
- An analysis was made regarding the digital education in different faculties allowed the identification of several problems but also identifying some solutions to address these problems.

Introduction (2)

- One of the problems that were identified is the situation in which during online exams, interruptions of some functionalities of the eLearning platform (such as submission process, the load of questions) and the need to intervene to resolve this unplanned incident during an extremely short time and for different users simultaneously: some interruptions are caused by a global issue that affects all the users and the intervention to remediate the situation usually is easier than in the case in which those interruptions are caused by local issues that affect a user or multiple users (in this last case, the local issues can vary between users).

- In such situations, the incident management process comes into the discussion to be able to have a minimal impact for the incidents not foreseen with this service, as well as to ensure faster support and remediation when an incident occurs.

Use Case

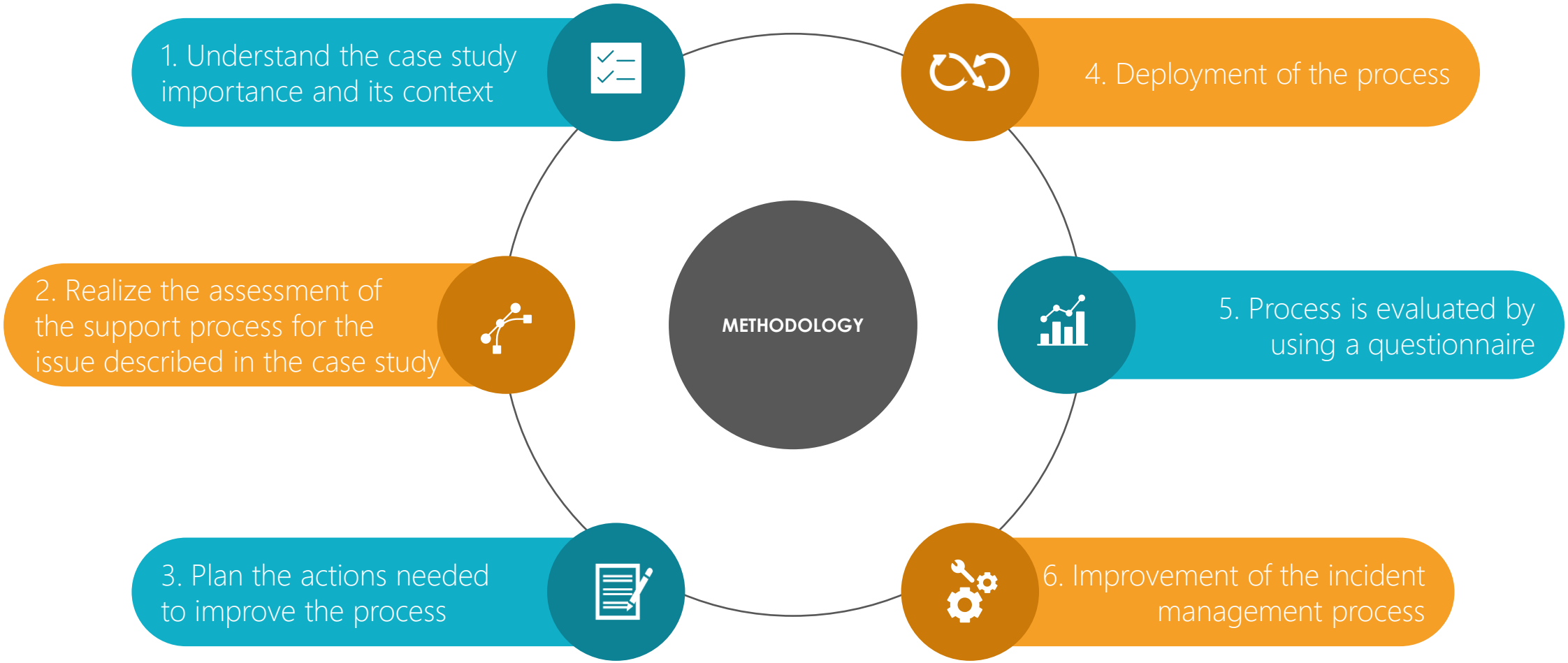
- At an exam, the students of the class are divided into groups of ten students each.
- All students take the same exam that starts at a predetermined time and ends at a predetermined time.
- In our described case the questions are uploaded previously by the professor and they are scheduled to appear at a certain time on the platform, similar to the way they are shared with the students in a physical class at the faculty on the paper.
- The students start the exam at the same time.
- The assignment ends after a certain period for all students regardless of whether they finished it or not, just to be in the same way as if they were in a physical class where all students had to complete the exam at the same time.

Use Case (2)

- Each group of students has an assistant that supervises them online with video camera.
- The tool used is Microsoft Teams or Zoom.
- Before the exam started there was the following issue identified. At one class the assistant (which presence was mandatory) had issues with the internet connection and was able to join the assignment on the platform with a delay of 20 minutes and because of that the students had to start the exam with a delay of 20 minutes.
- Taking into consideration that the deadline to submit the exam answers was set globally in application, to be the same for everyone, the professors and assistants were not able to change it in a timely manner fashion for this group of students.
- After several failed attempts, it was decided that the students will be allowed to send the exam by email to afford staying 20 minutes more than the deadline set in platform.
- In this scenario no processes were established and followed to resolve the issue. This is considered a traditional support request that does not have any framework in place for how it should be managed.

Methodology

- The analysis of the described use case includes the following phases:



Methodology (2)

1. Understand the case study importance and its context

- This case study was chosen as the one to be analyzed after having interviews with professors and assistants.
- They mentioned this issue because it was the one that happened many times and caused interruptions in the evaluation process.

Methodology (3)

2. Realize the assessment of the support process for the issue described in the case study

- To assess the support process from the case study in Figure 1 can be seen all the steps performed to resolve the issue.
- The main issue that can be extracted from the case study is that one class started later the exam because of a technical issue.
- To resolve the issue no process was followed, and the workaround applied caused inconsistency for users.

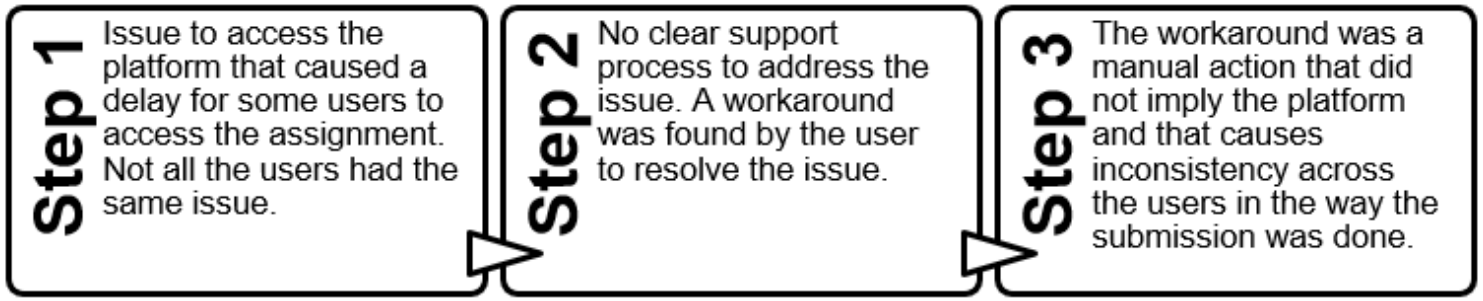


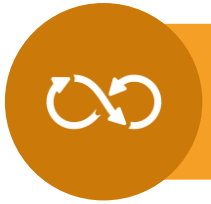
Figure 1 - Support process.

Methodology (4)

3. Plan the actions needed to improve the process

- To improve the process described in the case study our proposal is to create a flow of the incident management process that will help us to effectively manage the issues and their resolution.
- The process will be split into two parts:
  - service desk,
  - technical support.
- The service desk process consists of the following steps:
  - incident logging,
  - incident resolution,
  - incident closure.
- Technical support process will be initiated only if the incident is a major one and needs a deeper technical expertise.
- The incident management process is a simple one and helps us to have a clear framework defined for all users: professors, assistants, students that they can use whenever they have an issue.

Methodology (5)



4. Deployment of the process

- The process was communicated across all the stakeholders, and it had explained them how the incident management process works.
- For its deployment, a support tool was used to be able to have a single space where the incidents can be opened and the communication with users can be maintained.

5. Process is evaluated by using a questionnaire

- After the process was deployed fifty users were asked about their opinion about how the incidents are handled and 56% showed satisfaction because there is a dedicated team that handles all the incidents and can act proactively, while 44% said that the process was not clear and fast enough for them, and this caused a slow adoption.

Methodology (6)

6. Improvement of the incident management process

- As part of the improvement process, a chatbot was deployed.
- The chatbot is integrated with the incident management process and it supports automated detection of issues and resolution.
- The user can interact with the chatbot using text inputs but also speech inputs which make the communication even faster and more natural for the user. The chatbot generates phonetic and visual outputs.
- Once an incident is detected, the chatbot will pop-up in the lower part of the screen and will initiate a conversation with the user in which the chatbot will provide for the user, one or more suggestions (in different iterations) to fix the detected issue. At the end, if the detected issue is not solved, the chatbot will automatically connect the user to an available technical support person to assist the user.
- The user has the option to initiate a conversation with the chatbot whenever the user needs, by clicking on the chatbot button. In this case, the chatbot waits for the user input, and then it will provide a corresponding answer.
- The chatbot learns from previous experiences and can provide better solutions in the future. It also enables a preventive behavior in some cases
- Having the user assisted by a chatbot during an issue makes the duration needed to fix the issue decreasing significantly.

Results

- After the integration of the chatbot, 90 users (divided into two groups) participated into the evaluation of the incident management process:
  - *First Group*: 50 users had evaluated the process before the integration of the chatbot.
  - *Second Group*: 40 users which were interacting with the incident management process for the first time.
- The chatbot decreased the time needed to resolve the issues as illustrated in Table 1 and increased significantly the satisfaction of users as illustrated in Table 2.

	Before the integration of the Chatbot	After the integration of the Chatbot
Microphone troubleshoot	135 sec	36 sec
Camera troubleshoot	160 sec	39 sec
Uploading a document (due to a browser incompatibility)	1140 sec	85 sec
Accessing a document (extension problem)	720 sec	57 sec

Table 1. Average time needed to resolve some issues using the incident management process.

	Satisfied	Not Satisfied
Group 1 (50 users)	96.00 %	4.00 %
Group 2 (40 users)	92.50 %	7.50 %
Total (90 users)	94.44 %	5.56 %

Table 2. Users' satisfaction.

Conclusions

- The chatbot integration represented an efficient method to improve the quality of the online educational service, as it is capable to automatically support the users to resolve some issues but also to resolve some issues on its own automatically.
- Incident management and service desk implementations are a useful method to manage all the incidents related to the use of educational platform.
- The implementation demonstrated to be a supportive method for the local university.
- As future work, more case studies are envisaged, based on the interviews that will be held with the university personnel to improve the incident management process and to extend the chatbot capabilities. More training with new scenarios and more diverse data, is also envisaged for the chatbot.

Thank You

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