

*Exploratory study on pedagogical practices at the HITS of Sfax during and outside lockdown:
towards a hybrid teaching based on flipped classrooms*

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Abstract ;

In this paper we present an exploratory study on the tools, the resources and the teaching methods used at department of computer technologies of the Higher Institute of Technological Studies of Sfax, during and except the period of the lockdown. We first describe our survey object of the study, then we analyze the results from the retained answers, and finally we conclude our work by giving perspectives.

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- ✓ Educational resources
- ✓ Educational methods

1. Introduction

The growth of the Information and Communication Technologies (ICT) for Education (ICTE) sector and the development of digital technology are among the major subjects of public debate. Several national and regional initiatives through various meetings and symposia are intended to analyze the generalized integration of digital technology in education (Ndibnu-Messina Ethé, and Kouankem, 2021). While being in harmony with some positive results, many universities around the world provide distance education (DE) in addition to face-to-face teaching, including the Higher Institute of Technological Studies (HITS) of Sfax.

The spring 2020 lockdown, due to the COVID-19 pandemic, suddenly led to the switch to fully distance learning for all higher education establishments. Teachers have found themselves forced to adapt quickly to modes of interaction, for which they were not prepared, in order to ensure pedagogical continuity (Messaoui, Redondo, Molina and Pironom, 2021). This situation highlighted social, economic and educational inequalities, and also showed the weaknesses of educational governance : the continuity of teaching was essentially maintained by the individual initiatives of teachers (Wagnon, 2020).

In this context, we thought of conducting a study to explore the pedagogical practices in the Department of computer technologies of the HITS of Sfax and to seek the impact of the lockdown on these pedagogical practices in terms of tools, resources and traditional and active pedagogy methods.

2. Presentation of the exploratory study

For the preparation and administration of the survey, we used the "Google forms" platform in order to facilitate the retrieval of the answers and the generation of their graphs. The link corresponding to the survey on "Google forms" was sent to the students of the computer technologies department of the HITS of Sax, who had already lived the lockdown in April, May and November of the year 2020.

The survey includes four sections, the first one is related to the characteristics of the respondents, the three other sections concern respectively the tools used, the resources exploited, and the pedagogical methods adopted before, during and after the lockdown.

In the following, we will analyze the results for each section through the different questions proposed.

3. Analyse

3.1 Respondent Characteristics

The survey was proposed to the students of the department of computer technologies of the HITS of Sfax who lived the period of lockdown and for the most part the students of the 2nd year License speciality "Development of Information Systems" (DIS2), and the others are those of the 3rd year License level specialising in "Development of Information Systems" and "Computer Systems Networks" (DIS3 and CSN3), as well as the students of the Professional Master's degree of the 1st and 2nd years specialising in "Development of Information Systems and Networks" (PMDISN1 and PMDISN2). For the PMDISN1 level, only former students of the HITS of Sfax were asked to answer the survey.

We received 82 responses, 11 of which were erroneous. The 71 responses were distributed as follows : 51 for DIS2, 9 for DIS3, 2 for CSN3 and 9 for PMDISN 1 and 2.

The age of these students is ranged from 20 to 25 years, with the majority being between 20 and 22 years old, 57.7% were female and 42.3% were male.

3.2 Tools used

Different tools were proposed in the survey such as the Moodle platform of the Virtual University of Tunis (VUT), email, Google meet, Zoom, Messenger, social networks FaceBook (FB), Whatsapp and others such as Microsoft Teams and Discord (cited by students).

Figures Fig.1, Fig.2 and Fig.3 describe the histograms relating to the use of these tools before and outside the lockdown period:

Fig.1. Tools used before lockdown

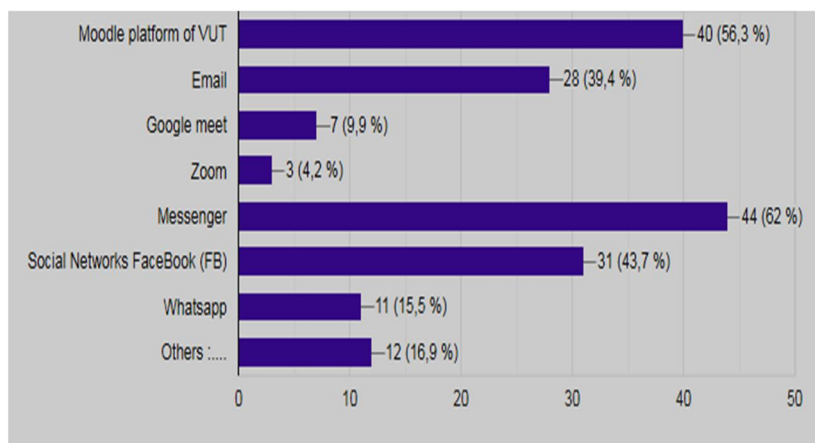
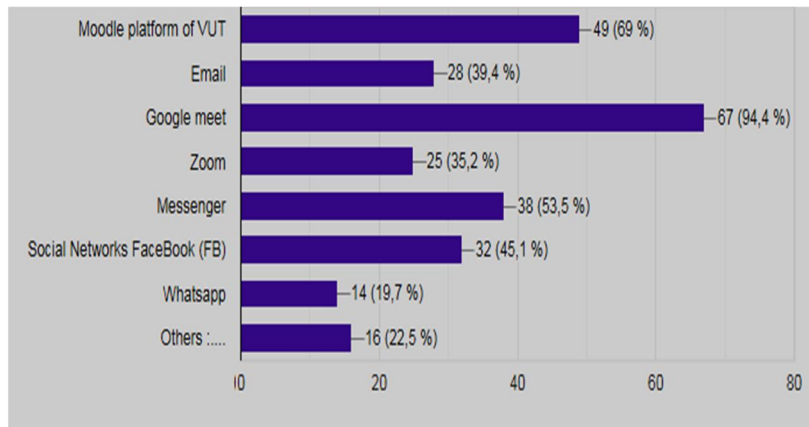
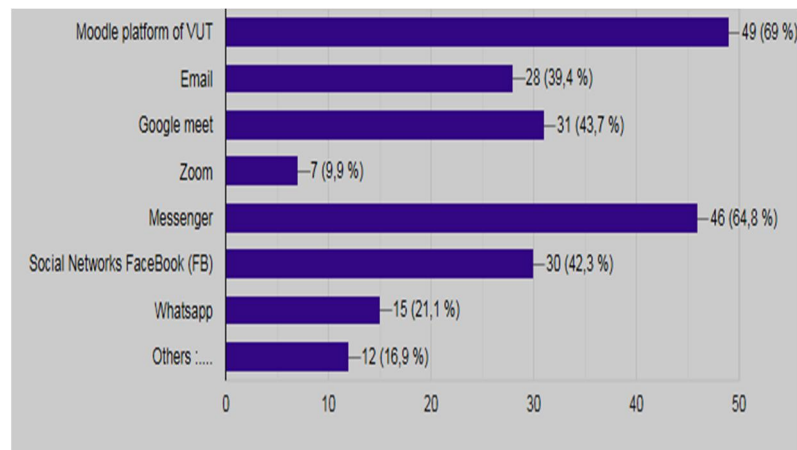


Fig.2. Tools used during lockdown**Fig.3. Tools used after lockdown**

From these histograms we note a variety of tools used in department of computer technologies of the HITS of Sfax. The VUT's Moodle platform and the Messenger have a usage rate that varies between 50% and 60% during and outside lockdown. Email and FB social networks have a usage rate of around 40% during and outside of lockdown.

We note for Whatsapp a rate of 15.5% before lockdown and around 20% during and after lockdown.

For video conferencing tools Google meet is the most used compared to Zoom, Microsoft teams and Discord, with a very high rate of 94.4% during lockdown, low of 9.9% before lockdown and average of 43.7 % after lockdown.

The low use of videoconferencing tools before lockdown is explained by the fact that before the decision to switch to distance education during the lockdown period, there was the possibility for teachers to teach remotely in the event that the teacher is affected by the

Covid19 even if some students are also infected. Then following the decision of the Ministry of Higher Education, a switch to distance education was imposed on all universities. Likewise, after the period of total lockdown, there was the possibility of teaching at a distance.

With regard to the quality of the internet connection and the PC, we note that it

was poor for 19.7% of the students during lockdown, this rate is considered high by comparing it with the rates relating to periods outside lockdown (see the figures Fig. 4, Fig.5 and Fig.6). It can be deduced that almost one fifth of the students are not well equipped with a good connection or a PC at home.

Fig.4. The quality of the internet connection and the PC before lockdown

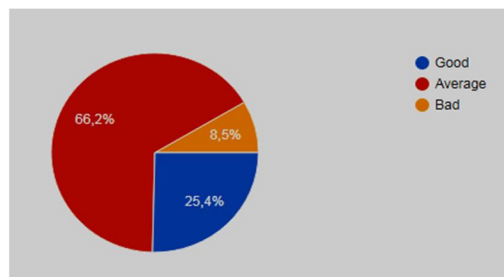


Fig.5. The quality of the internet connection and the PC during lockdown

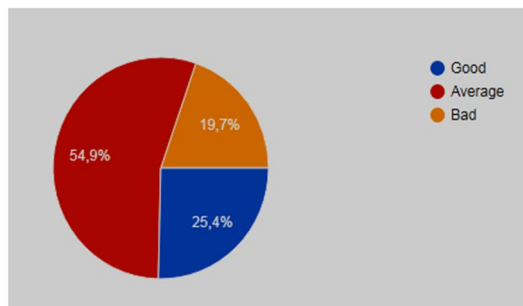
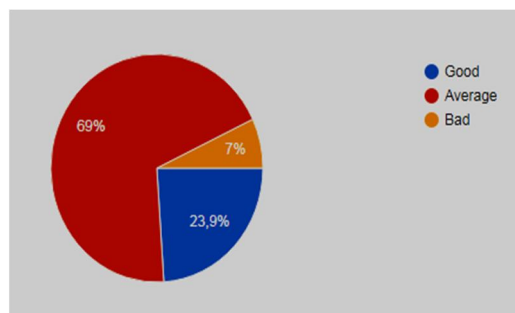


Fig.6. The quality of the internet connection and the PC after lockdown



The rate of satisfaction about the use of these tools in general is only 63.4% as shown in figure Fig.7, while figure Fig.8

indicates that 66.2% of students consider that their knowledge in terms of digital tools have evolved after lockdown.

Fig.7. Rate of satisfaction about the use of digital tools

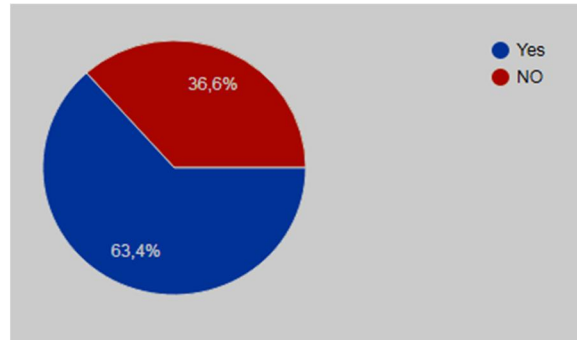
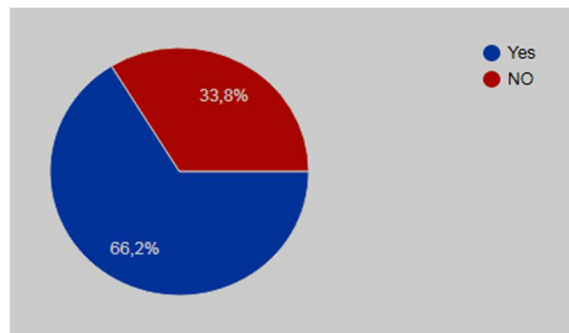


Fig.8. Rate of evolve in knowledge of digital tools after lockdown



Students satisfied with the use of these tools cite the following advantages :

- Ease of communication
- The tools facilitate DE and communication with teachers
- Simplicity and ease
- Time saving and more convenient
- Very effective
- A better understanding of courses and workshops
- Ease of contacting the teacher
- Flexibility of session schedule
- Possibility to record the session taught remotely
- Availability of the recorded course at any time
- VUT's Moodle platform is always accessible and easy to use
- VUT's Moodle platform is a better platform
- Availability of VUT resources and communication with the teacher through FB

- Facilitates student learning and also cost effective by saving transportation costs
- It is easier to study remotely for some courses
- Possibility of working at home without wasting the time to going to HITS

Students who are not satisfied with the use of these tools cite the following disadvantages :

- Poor connection
- Difficulty concentrating and understanding during a distance magistral course
- Poor interaction and communication with the teacher
- Difficulty in understanding courses and workshops
- Poor scheduling of sessions during lockdown

- Google meet and Zoom are not stable for all
- Variety of video conferencing tools: preferably use one tool by all teachers (Google meet, Microsoft Teams or Zoom)

3.3 Resources used

Various resources were proposed in the survey such as paper and digital supports, Tutorials, HTTP Links, books, synchronous (example via Google meet, Zoom, ...) and asynchronous communications (example via VUT discussion forum, FB private group,...), videos, and others.

The histograms in figures Fig.9, Fig.10 and Fig.11 show the utilization rates of the different resources before, during and after the lockdown period:

Fig.9. Resources used before lockdown

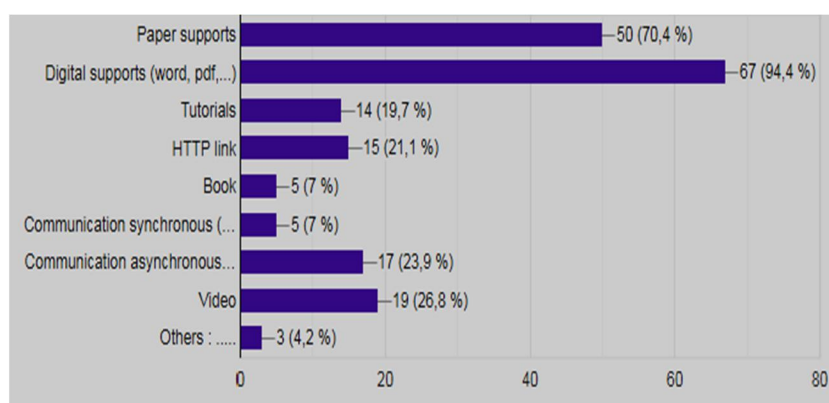
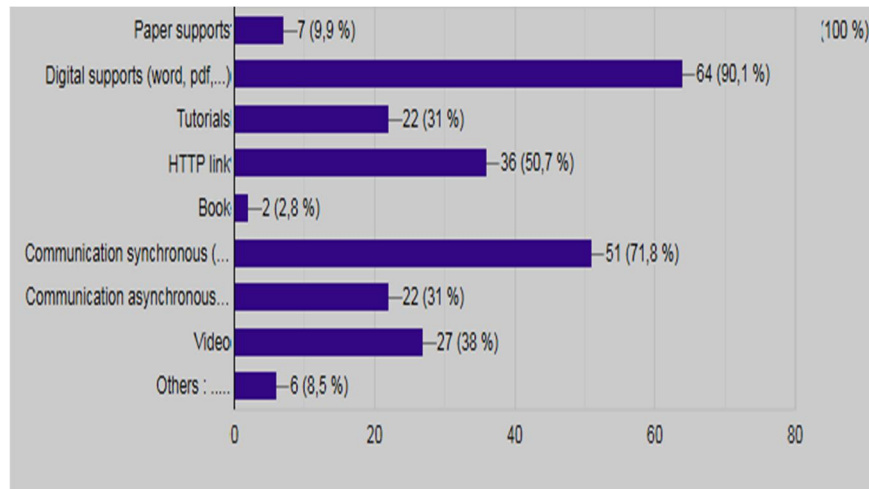
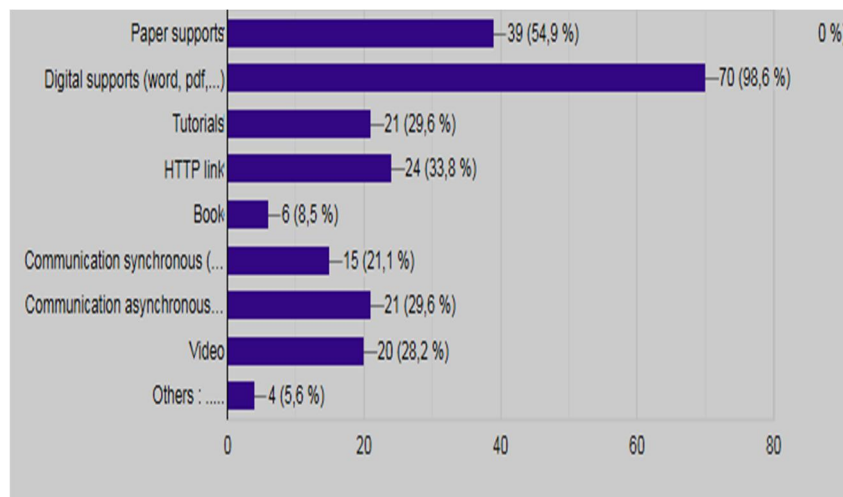


Fig.10. Resources used during lockdown**Fig.11. Resources used after lockdown**

From these histograms we can see a variety of resources used at the department of computer technologies of the HITS of Sfax before, during and after the lockdown.

Before the lockdown, we note that the highest rate is 94.4% for digital supports then a rate of 70.4% for paper supports.

During lockdown, the highest rate is 90.1% for digital supports followed by

the rate of synchronous communications which is 71.8%. This last rate was 7% before lockdown and 21.1% after lockdown, so we note a significant increase in the use of synchronous resources during lockdown.

The utilization rate of video resources increases from 26.8% before lockdown to 38% during lockdown, the same for tutorials, their utilization rate increases from 19.7% to 31%, and as regards

HTTP links their utilization rate goes from 21.1% to 50.7%.

After lockdown, there is a reprise of paper supports type resources, but with a rate of 50.9% instead of 70.4% before lockdown.

For tutorial, HTTP link, book, synchronous and asynchronous communication resources, their utilization rate increased after lockdown compared to those before lockdown. We can then deduce that lockdown has a

good impact on the variety of resources used.

The lowest level of student satisfaction with the resources used was during lockdown, in fact 14.1% answered “not satisfied” and 39.4% answered “average”. The rate of student dissatisfaction with the resources used is less than 5% for the periods before and after lockdown (see figures Fig.12, Fig.13 and Fig.14). It is deduced that the students became more accustomed to the variety of resources after lockdown.

Fig.12. Level of satisfaction with resources used before lockdown

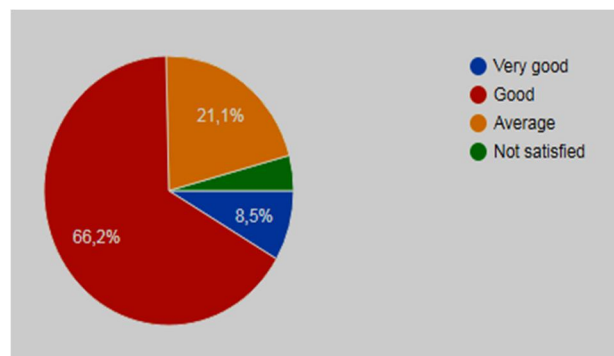


Fig.13. Level of satisfaction with resources used during lockdown

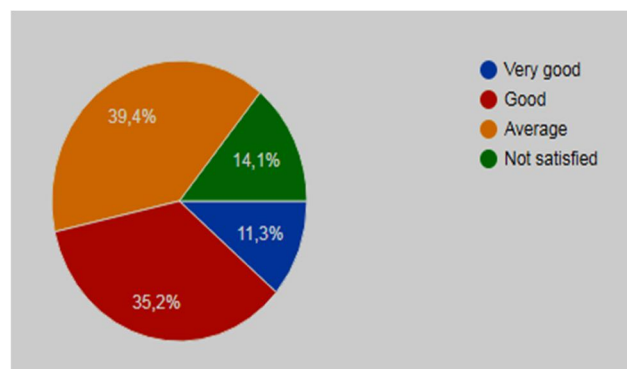
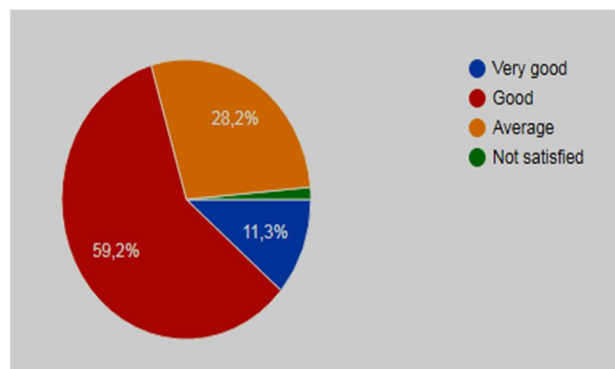


Fig.14. Level of satisfaction with resources used after lockdown

When we asked students to give their suggestions for improving the learning resources for the future, we received the following responses :

- Stop the use of paper supports.
- Improve the quality of the internet connection at the HITS of Sfax.
- Establish a bank for the courses of the HITS of Sfax.
- To ensure more synchronous and asynchronous communication in normal time
- To make the resources more varied for the same lesson
- Improve the synchronous communication mode.
- Offer more video resources
- Everything is good, but the book and paper supports are very important in academic life
- For some courses such as "the network architecture", there is a need

for more outings in addition to the variety of teaching resources, to better understand the course and its practice in real life.

3.4 The pedagogy methods adopted

In this section, students were asked to choose the pedagogy method most adopted by their teachers during and outside lockdown. The choice mainly considers traditional teacher-centered pedagogy methods and active student-centered pedagogy methods and precisely the flipped classrooms.

Figures Fig.15, Fig.16 and Fig.17 show the rates of use of the different pedagogy methods before and outside the lockdown period :

Fig.15. Pedagogy methods adopted before lockdown

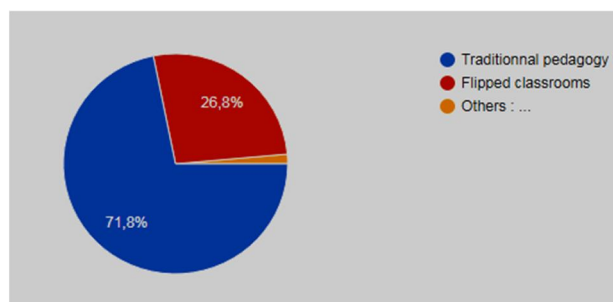


Fig.16. Pedagogy methods adopted during lockdown

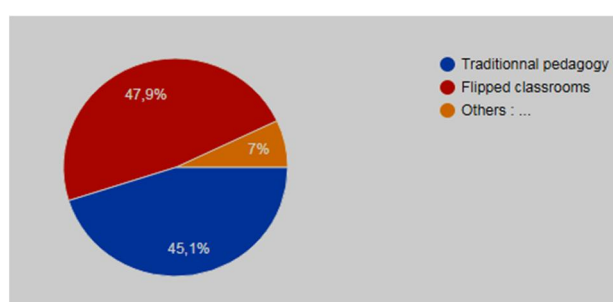
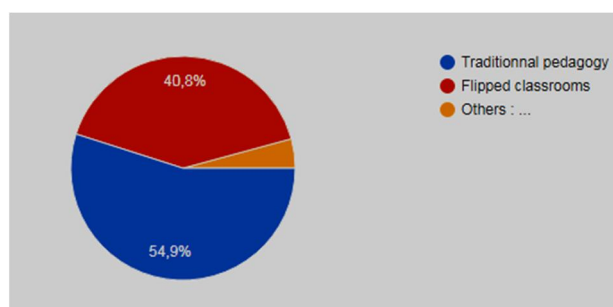


Fig.17. Pedagogy methods adopted after lockdown



The active method of flipped classes is well used during lockdown in comparison with its use before lockdown, in fact the rate of its use goes from 26.8% before lockdown to 47.9% during lockdown. It is concluded that the learning inversion facilitates distance learning for some lessons.

Some teachers used the flipped classrooms method during lockdown and continued to use it after lockdown. We note that the rate of its use increased from 26.8% before lockdown to 40.8% after lockdown and obviously a decrease in the rate of use of traditional methods which went from 71.8% before lockdown to 54.9% after lockdown. We can then deduce that lockdown has a

good impact on the use of active teaching methods, however we must raise awareness even more about their advantages and in the first place the autonomy of the students (Lamine, 2018).

The rate of students who affirm the possibility of communicating with the

teacher outside of class sessions is 77.5% before lockdown and 71.8% during lockdown. This rate is significant and is more increased after lockdown and became 83.1% (see figures Fig.18, Fig.19 and Fig.20).

Fig.18. Possibility of communication with the teacher outside of class sessions before lockdown

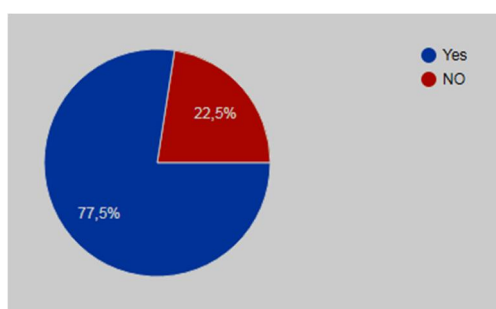


Fig.19. Possibility of communication with the teacher outside of class sessions during lockdown

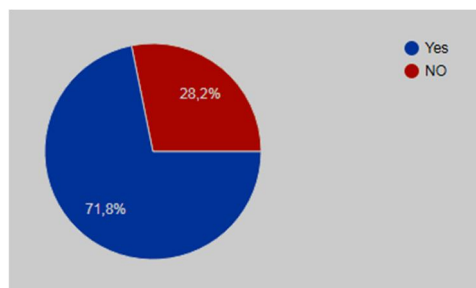
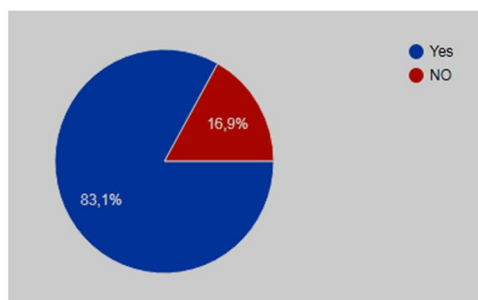


Fig.20. Possibility of communication with the teacher outside of class sessions after lockdown



The level of adaptation to the rhythm of the course is worst during the period of lockdown: 19.7% of the students consider it to be bad, whereas outside

this period this same rate is very low : 4.2% before lockdown and 2.9% after lockdown (see figures Fig.21, Fig.22 and Fig.23).

Fig.21. Level of adaptation to the rhythm of the course before lockdown

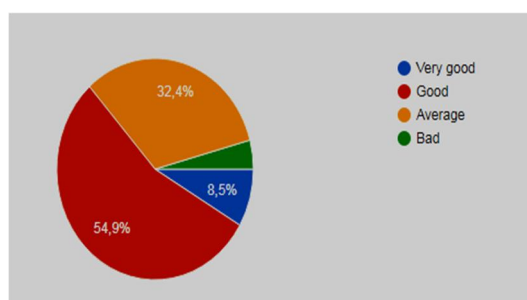


Fig.22. Level of adaptation to the rhythm of the course during lockdown

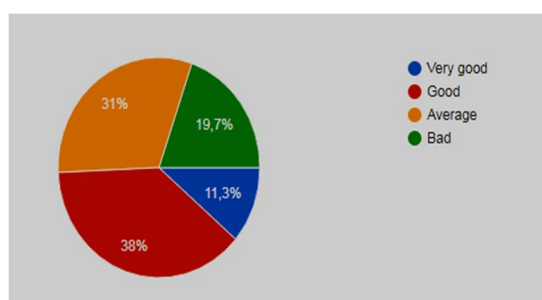
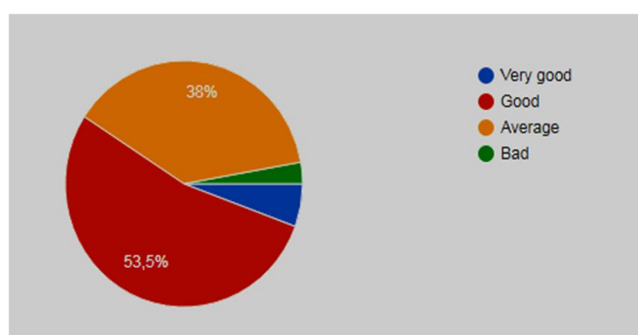
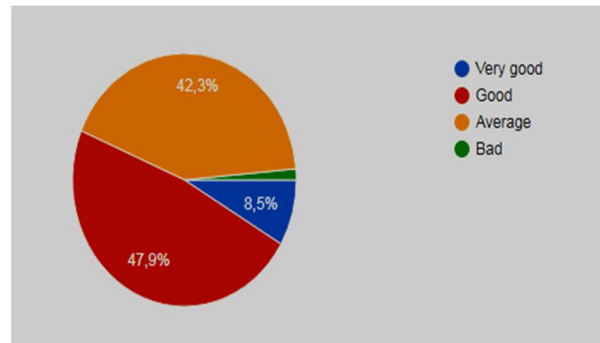
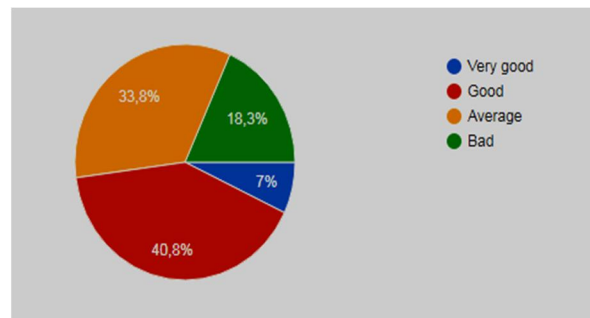
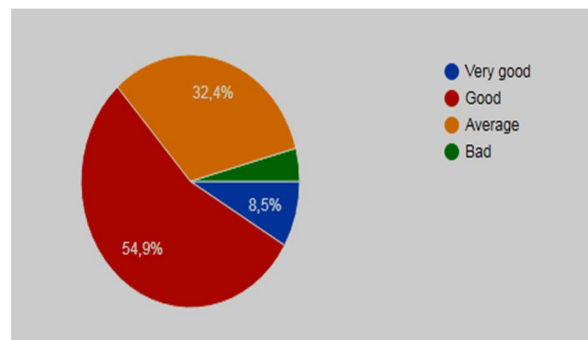


Fig.23. Level of adaptation to the rhythm of the course after lockdown



The judgment of students on their degree of learning is lowest during the lockdown period, in fact a rate of 18.3% of students considers it bad, while outside this period this same rate is very

low, it is around 1.3% before lockdown and 4.2% after lockdown (see figures Fig.24, Fig.25 and Fig.26).

Fig.24. Degree of student learning before lockdown**Fig.25. Degree of student learning during lockdown****Fig.26. Degree of student learning after lockdown**

4. Conclusion and perspectives

In this paper we have presented and analyzed the results of the exploratory study on teaching practices in department of computer technologies of HITS of Sfax before, during and after lockdown.

The analyzes of some results relating to the tools and resources used indicate the adaptability of the teachers of the department of computer technologies of HITS of Sfax in an emergency situation, or during the changeover in full distance learning. This situation has also led to cognitive, geographic, social, and physical distancing (Leclercq, 2020).

The teachers relied on the tools they already knew, such as VUT's Moodle platform, which is a reference tool in DE. But this platform is not well suited to synchronous exchanges, much in demand in DE. Which explains the use of a few video conferencing tools according to their own choice.

In general, the most pejorative rates were recorded during lockdown. Indeed, the feedback from some students shows their dissatisfaction with understanding by following a distance course. However, other students who are satisfied suggest using digital resources more and improving synchronous communications.

In terms of the pedagogical methods adopted, we envisage as perspectives, a toggle towards a hybrid education based on flipped classrooms instead of magistral teaching. Indeed, with the start of lockdown ending, a good number of teachers are changing their traditional teaching method and asking their students to read or view the resources posted online before attending the classroom session. The course of the session is devoted first to a short reminder of the course by the teacher if necessary, and then to the realization of the activities by the students. Thus, the class has become convivial and much more student-centered.

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