Appendices

Appendix 1. Pilot study questionnaire structured interview questionnaire (Portuguese version)

QUESTIONÁRIO SOBRE O USO DAS TICS NA UP

Este questionário pretende recolher a informação sobre as condições reais dos estudantes de UP no que diz respeito ao uso das ICTs (Internet / computador / celular, etc.) em casa ou na universidade. O presente questionário é de carácter anónimo e as informações colectadas são confidenciais e não serão usadas para outros fins se não a pesquisa. Os resultados desta pesquisa serão apresentados em UP e tornados públicos para todos.

1. QUESTÕES DE CARÁCTER GERAL

1.1 SUA FACULDADE? _____

1.2 QUAL É O SEU CURSO?

_____

1.3. COM QUE FREQUÊNCIA USA A INTERNET?

- ☐ MUITO POUCO
- ☐ POUCO
- ☐ OCASIONALMENTE
- ☐ QUASE SEMPRE
- ☐ SEMPRE

1.4 QUE FERRAMENTA USA PARA ACEDER AO SIGEUP DE MODO A VER OS RESULTADOS/MENSALIDADES?

- ☐ COMPUTADOR
- ☐ CELULAR
- ☐ TABLET
- ☐ OUTRO (MENCIONAR)_____

2. QUESTÕES ACERCA DO USO DO COMPUTADOR/INTERNET EM CASA

2.1 VOCÊ TEM UM COMPUTADOR EM CASA PARA TRABALHOS DE CASA?

- ☐ SIM
- ☐ NÃO

2.2 QUE FERRAMENTA VOCÊ USA EM CASA PARA PESQUISA DE TRABALHOS DA FACULDADE?

- ☐ LIVROS
- ☐ SMART PHONE
- ☐ TABLET
- ☐ COMPUTADOR
- ☐ OUTRO (MENCIONAR)_____

2.3 QUE FERRAMENTA VOCÊ USA EM CASA PARA VER FILMES/VIDEOS?

- ☐ LEITOR DE DVD/BLU RAY
- ☐ TABLET
- ☐ SMART PHONE
- ☐ COMPUTADOR
- ☐ OUTRO (MENCIONAR)_____

2.4 QUAL É O NÍVEL DE CONECTIVIDADE DE INTERNET DA SUA CASA?

- ☐ SEM CONEXÃO
- ☐ MUITO MÁ (LENTA)
- ☐ MODERADA

- BOA
- MUITO BOA

2.5 COM QUE FREQUÊNCIA USA O WHATSAPP?

- MUITO POUCO
- POUCO
- OCASIONALMENTE
- QUASE SEMPRE
- SEMPRE

2.6 COM QUE FREQUÊNCIA USA O FACEBOOK?

- MUITO POUCO
- POUCO
- OCASIONALMENTE
- QUASE SEMPRE
- SEMPRE

2.7 COM QUE FREQUEÊNCIA USA O YOUTUBE?

- MUITO POUCO
- POUCO
- OCASIONALMENTE
- QUASE SEMPRE
- SEMPRE

3. Questões acerca das condições do uso da internet/computador na universidade

3.1 POSSUI A CONTA WI-FI DA UPNET Wifi?

- SIM
- NÃO
- ESQUECI OS MEUS DADOS DE ACESSO (USERNAME/SENHA)

3.2 COM QUE FREQUEÊNCIA USA O COMPUTER FARM DA UP?

- MUITO POUCO
- POUCO
- OCASIONALMENTE
- QUASE SEMPRE
- SEMPRE

3.3 QUAL É O SEU SENTIMENTO SOBRE A VELOCIDADE DE CONEXÃO INTERNET NA UNIVERSIDADE (UPNET)?

- MUITO MÁ
- MÁ
- MODERADA
- BOA
- MUITO BOA

4. INFORMAÇÃO ADICIONAL

SUA IDADE: _____ (ANOS) SEU GÊNERO: ( ) MASCULINO FEMININO ( ) SEU SEMESTRE _____

MUITO OBRIGADO PELA SUA COLABORAÇÃO

Appendix 2. Pilot study questionnaire structured interview questionnaire (English version)

QUESTIONNAIRE

This questionnaire intends to collect the information about the real conditions of the students from UP regarding to the use of ICTs (Internet/computer/mobile, etc.) at home or at the university. The present questionnaire is anonymous and the collected information is confidential and will not be used for purpose rather than research. The results of this research will be presented at UP and made public for everyone.

1. General purpose questions

1.1 - WHAT IS YOUR FACULTY?

_____

1.2 - WHAT IS YOUR COURSE?

_____

1.3. HOW OFTEN DO YOU USE INTERNET?

- ☐ VERY INFREQUENTLY
- ☐ SOMEWHAT INFREQUENTLY
- ☐ OCCASIONALLY
- ☐ SOMEWHAT FREQUENTLY
- ☐ VERY FREQUENTLY

1.3 WHICH TOOL DO YOU USE TO ACCESS THE SIGEUP TO SEE YOUR ACADEMIC RESULTS OR FEES?

- ☐ COMPUTER
- ☐ MOBILE PHONE
- ☐ TABLET
- ☐ OTHER (MENTION IT)_____

2. Questions about the use of computer at home

2.1 DO YOU HAVE A COMPUTER AT HOME FOR HOMEWORK?

- ☐ YES
- ☐ NO

2.2 WHICH TOOL DO YOU USE AT HOME FOR HOMEWORK RESEARCH?

- ☐ BOOK LIBRARY
- ☐ MOBILE PHONE
- ☐ TABLET
- ☐ COMPUTER
- ☐ OTHER (MENTION IT) _____

2.3 WHICH TOOL DO YOU USE AT HOME FOR WATCHING VIDEOS/MOVIES?

- ☐ DVD PLAYER
- ☐ TABLET
- ☐ MOBILE PHONE
- ☐ COMPUTER
- ☐ OTHER (MENTION)_____

2.4 WHAT IS THE LEVEL OF INTERNET CONNECTION AT HOME?

- ☐ VERY GOOD
- ☐ GOOD
- ☐ MODERATE
- ☐ BAD
- ☐ VERY BAD

- NO INTERNET

2.5 HOW OFTEN DO YOU USE WHATSAPP?

- VERY INFREQUENTLY
- SOMEWHAT INFREQUENTLY
- OCCASIONALLY
- SOMEWHAT FREQUENTLY
- VERY FREQUENTLY

2.6 HOW OFTEN DO YOU USE FACEBOOK?

- VERY INFREQUENTLY
- SOMEWHAT INFREQUENTLY
- OCCASIONALLY
- SOMEWHAT FREQUENTLY
- VERY FREQUENTLY

2.7 HOW OFTEN DO YOU USE YOUTUBE?

- VERY INFREQUENTLY
- SOMEWHAT INFREQUENTLY
- OCCASIONALLY
- SOMEWHAT FREQUENTLY
- VERY FREQUENTLY

3. Questions about the conditions of use of Internet/computer at university

3.1 DO YOU HAVE THE UPNET WIFI USERNAME?

- YES
- NO
- I FORGOT MY PASSWORD

3.2 HOW OFTEN DO YOU USE THE UNIVERSITY'S COMPUTER FARM?

- VERY INFREQUENTLY
- SOMEWHAT INFREQUENTLY
- OCCASIONALLY
- SOMEWHAT FREQUENTLY
- VERY FREQUENTLY

3.3 WHAT IS YOUR FEELING ABOUT THE INTERNET CONNECTION SPEED AT THE UNIVERSITY (UPNET)?

- VERY GOOD
- GOOD
- MODERATE
- BAD
- VERY BAD

4. ADDITIONAL INFORMATION

YOUR AGE: _____ (YEARS) YOUR GENDER: ( ) MALE FEMALE ( ) YOUR SEMESTER _____

THANK YOU VERY MUCH FOR YOUR CONTRIBUTION

Appendix 3. IMI questionnaire (English version)

Motivation Test

IMI uses a set of 22 questions based on multi-choice likert-type scale, as follows:

1	2	3	4	5	6	7
Not at all true			Somewhat true			Very true

The questions will be:

1. While I was working on the task in the learning environment I was thinking about how much I enjoyed it.
2. During the learning environment I did not feel at all nervous about doing the task. (R)
3. I felt that it was my choice to do the task in the learning environment.
4. I think I am pretty good at this task During the learning environment.
5. During the learning environment I found the task very interesting.
6. During the learning environment I felt tense while doing the task.
7. During the learning environment I think I did pretty well at this activity, compared to other students.
8. Doing the task in the learning environment was fun.
9. During the learning environment I felt relaxed while doing the task. (R)
10. During the learning environment I enjoyed doing the task very much.
11. During the learning environment I didn’t really have a choice about doing the task. (R)
12. I am satisfied with my performance at this task in the learning environment.
13. During the learning environment I was anxious while doing the task.
14. During the learning environment I thought the task was very boring. (R)
15. During the learning environment I felt like I was doing what I wanted to do while I was working on the task.
16. During the learning environment I felt pretty skilled at this task.
17. During the learning environment I thought the task was very interesting.
18. During the learning environment I felt pressured while doing the task.
19. During the learning environment I felt like I had to do the task. (R)
20. During the learning environment I would describe the task as very enjoyable.
21. During the learning environment I did the task because I had no choice. (R)
22. After working at this task for a while, I felt pretty competent.

Appendix 4. IMI questionnaire (Portuguese version)

Questionário de teste motivacional sobre o Ambiente das aulas

O presente questionário serve apenas para o propósito da pesquisa em causa, não tendo nenhum valor na avaliação.

Escolha uma das opções para cada uma das perguntas que se seguem, no que diz respeito ao ambiente de aprendizagem usado durante as aulas. Use a escala abaixo:

1	2	3	4	5	6	7
Não é de todo verdade			Um pouco verdade			Muito verdadeiro

Questão	Opção
1. Enquanto eu estava trabalhando na tarefa, eu estava pensando em quanto eu gostava disso.	[1] [2] [3] [4] [5] [6] [7]
2. Eu não me senti nada nervoso (a) em fazer a tarefa. (R)	[1] [2] [3] [4] [5] [6] [7]
3. Eu senti que era minha escolha fazer a tarefa.	[1] [2] [3] [4] [5] [6] [7]
4. Eu acho que sou muito bom nessa tarefa.	[1] [2] [3] [4] [5] [6] [7]
5. Eu achei a tarefa muito interessante.	[1] [2] [3] [4] [5] [6] [7]
6. Eu senti-me tenso(a) ao fazer a tarefa.	[1] [2] [3] [4] [5] [6] [7]
7. Eu acho que me saí muito bem nessa atividade, em comparação com outros alunos.	[1] [2] [3] [4] [5] [6] [7]
8. Fazer a tarefa foi divertido.	[1] [2] [3] [4] [5] [6] [7]
9. Eu senti-me relaxado enquanto fazia a tarefa. (R)	[1] [2] [3] [4] [5] [6] [7]
10. Eu gostava muito de fazer a tarefa.	[1] [2] [3] [4] [5] [6] [7]
11. Eu realmente não tinha escolha sobre como fazer a tarefa. (R)	[1] [2] [3] [4] [5] [6] [7]
12. Estou satisfeito (a) com meu desempenho nessa tarefa	[1] [2] [3] [4] [5] [6] [7]
13. Eu fiquei ansioso(a) ao fazer a tarefa.	[1] [2] [3] [4] [5] [6] [7]
14. Eu achei a tarefa muito chata. (R)	[1] [2] [3] [4] [5] [6] [7]
15. Eu senti que estava fazendo o que queria enquanto trabalhava na tarefa.	[1] [2] [3] [4] [5] [6] [7]
16. Eu senti-me bastante habilidoso nessa tarefa.	[1] [2] [3] [4] [5] [6] [7]
17. Eu achei a tarefa muito interessante.	[1] [2] [3] [4] [5] [6] [7]
18. Eu senti-me pressionado durante a execução da tarefa.	[1] [2] [3] [4] [5] [6] [7]
19. Eu senti que tinha que fazer a tarefa. (R)	[1] [2] [3] [4] [5] [6] [7]
20. Eu descreveria a tarefa como muito agradável.	[1] [2] [3] [4] [5] [6] [7]
21. Eu fiz a tarefa porque não tinha escolha. (R)	[1] [2] [3] [4] [5] [6] [7]
22. Depois de trabalhar nessa tarefa por um tempo, me senti bastante competente.	[1] [2] [3] [4] [5] [6] [7]

Appendix 5. Learning outcomes assessment forms

5.1 Time1 (traditional)

Laboratory III (Java) – 2019 [DAY SHIFT] TIME 1

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation

ID	Question	Correct Answer

1	The result of running the programme below will be?
	int a =5, b = 2, c = 5;
	int R = a + b - c;
	System.out.print(a+b+c+R);
	
	A) 12 B) 5252 C) 10 D) 14 E) 16
		D

2	Which of the instructions below will have a result of 2? int x = 17, y = 3; System.out.print(x OP y); A) OP= % B) OP = / C) OP= * D) OP = + E) OP = -	A
3	Consider the questions below: float v = 9.9, b= 0.1; System.out.println(“Result:”+(v<=10 && b>0.1); The result will be: A) Result:true B) Result:false C) Result:1 E)Result:null	B

4	What will be the result of the instruction below?
	float v = 9.9, b= 0.1;
	if(!(v>9))
	System.out.print(“V”);
	else
	System.out.print(“F”);
	if(b>0)
	System.out.print(“P”);
	else
	System.out.print(“N”);
	
	A)FP B)F C)N D) VN E) VP
		FP

5	Which of the following operators is used to interrupt a loop? A) continue B) break C) stop D) do E) while	B

6	What will be the result of the instruction below?
	int a =5, b = 1;
	int R = a -- + --b + --a;
	System.out.print("a="+a+"b="+b+"R="+R);
	
	A) a=3b=0R=8 B) a=3b=0R=7 C) a=3b=0R=9 D) a=3b=1R=8 a=3b=0R=7
	E) a=4b=0R=4
		A

7	In java, can a variable type int receive a value type float? A) Yes, because the conversion is done automatically. B) Yes, because there is no difference between int and float C) No, because there may be loss of value D) No, because an int contains float values too. E) None of the alternatives is correct	C

8	What will be the output of the instructions below?
	`for(int i=4;i>=1;i--)`
	`{`
	`  for(int j=i;j>=1;j--)`
	`  {`
	`  System.out.print("*");`
	`  }`
	`  System.out.println();`
	`}`
	
	A)
	*
	* *
	* * *
	* * * *
	
	B)
	* * * *
	* * *
	* *
	*
	
	E)
	*
	
	C)
	* * * *
	* * *
	* *
	*
	
	D)
	* * * *
	* * * *
	* * * *
		B

9	Considering the array below, how do we print the sum of the first and last elements? int Ar[ ] = { 5, 6, 8 ,11, 23}; A) System.out.print(Ar[1] + Ar[5]); B) System.out.print(Ar[0] + Ar[5]); C) System.out.print(Ar[0] + Ar[4]); D) System.out.print(Ar[1] + 11); E) System.out.print(Ar[1]);	C
10	What is the size of a char type variable in memory? A) 8 bits B) 2 Bytes C) 32 bits D) 4 Bytes E) 1 bit	B

Laboratory III (Java) – 2019 [NIGHT SHIFT] TIME 1

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation

ID	Question	Correct Answer
1	What is the size of a char type variable in memory? A) 8 bits B) 1 bit C) 32 bits D) 8 bits E) 32 Bytes	None of them

2	What will be the result of the instruction below?
	float v = 9.9, b= 0.1;
	if(v>9)
	System.out.print("V");
	else
	System.out.print("F");
	if(b>0)
	System.out.print("P");
	else
	System.out.print("N");
	
	A)FP B)F C)N D) VN E) VP
		VP
		
		E

3	Which of the instructions below will have a result of 2? int x = 17, y = 3; System.out.print(x OP y); A) OP= % B) OP = / C) OP= * D) OP = + E) OP = -	A
4	Considering the array below, how do we print the sum of the second and the last element? int Ar[ ] = { 5, 6, 8 ,11, 23}; A) System.out.print(Ar[1] + Ar[5]); B) System.out.print(Ar[0] + Ar[5]); C) System.out.print(Ar[1] + Ar[4]); D) System.out.print(Ar[1] + 11); E) System.out.print(Ar[1]);	C

5	The result of running the programme below will be?
	int a =5, b = 2, c = 5;
	int R = a + b - c;
	System.out.print(a+b+c+R);
	
	A) 12 B) 5252 C) 10 D) 14 E) 16
		D

6	Which of the following operators is used to interrupt a loop? A) continue B) stop C) do D) do E) None of the previous alternatives	E

7	Consider the questions below: float v = 9.9, b= 0.1; System.out.println(“Result:”+(v<=10 && b>0.1); The result will be: A) Result:true B) Result:false C) Result:1 E)Result:null	B
8	In java, can a variable type int receive a value type float? A) Yes, because the conversion is done automatically. B) Yes, because there is no difference between int and float C) No, because there may be loss of value D) No, because an int contains float values too. E) None of the alternatives is correct	C

9	What will be the output of the instructions below?
	for(int i=4;i>=1;i--)
	{
	for(int j=i;j>=1;j--)
	{
	System.out.print("*");
	}
	System.out.println();
	}
	
	A)
	*
	* *
	* * *
	* * * *
	
	B)
	* * * *
	* * *
	* *
	*
	
	E)
	*
	
	C)
	* * * *
	* * *
	* *
	*
	
	D)
	* * * *
	* * * *
	* * * *
		B

10	What will be the result of the instruction below?
	int a =5, b = 1;
	int R = a -- + --b + --a;
	System.out.print("a="+a+"b="+b+"R="+R);
	
	A) a=3b=0R=8 B) a=3b=0R=7 C) a=3b=0R=9 D) a=3b=1R=8
	a=3b=0R=7
	E) a=4b=0R=4
		A

5.2 Time2 (GFC)
Laboratory III (Java) – 2019 [DAY SHIFT] TIME 2

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation

Diagnostic test II REG	Correct answer
1 In the Java framework, we can conclude that: a) only 1 main() method is allowed per file. b) We cannot have a class without main () c) We cannot have two classes in the same file. d) All of the alternatives are correct. e) None of the alternatives.	1. a)
2 Which of the following is correct? a) A static method can only access static data b) We can use an object to access a static method. c) We can use a class to access a static method d) All statements are correct e) None of the alternatives	2. d)
3 Overloading consists in having: (a) two methods with the same name and difference type (void / non void). b) Two methods with the same name but with different parameters. c) Two methods totally equal. d) None of the alternatives. e) All statements are correct.	3. b)
4 Consider the following statements: a) In inheritance, a class can inherit (extends) only one class. b) In inheritance, an interface cannot implements another interface. c) In inheritance, a class can inherit (extends) another class and implements an interface. d) All of the previous alternatives are correct. e) None of the previous alternatives	4. d)
5 If we declare a method as private: a) Cannot be accessed outside the class b) Can be accessed by a subclass that is in the same package c) None of the alternatives is correct d) Alternatives (a) and (b) are correct e) Alternative a) is correct and b) is wrong.	5. e)
6 What will be the visibility of a variable if it is declared without public, private or protected? a) private b) protected c) friendly d) public e) None of the alternatives	6. a)

7 Choose the right alternative a) A class may contain two main () methods. b) We can not create more than 3 objects of the same class c) The Scanner class belongs to the useful package. d) We can extend a class declared as FINAL e) None of the alternatives.	7. c)
8 Which one of the following classes does not belong to the util package? a) Scanner b) Timer c) Math d) Random e) Vector	8. c)
9 In multiple inheritance in Java, we can conclude that: a) It is possible to implement it through the use of Interfaces b) It cannot be implemented in Java c) It can be implemented by extending two classes d) None of the alternatives is correct e) All of the alternatives are correct.	9. a)
10 Which of the following statements is wrong regarding Exceptions: a) There can be several catch statements for a single try block b) It is forbidden to insert more than one try statement inside a program c) The finally statement will always be executed, regardless of try and catch d) the throws statement differs from the thow e) points a) and c) are correct	10. b)

Laboratory III (Java) – 2019 [DAY SHIFT] TIME 2

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation

	Correct answer
1 In the Java framework, we can conclude that: (a) the statements are case sensitive. b) The name of the file must be equal to the name of the class that has the main() method. c) We can have two classes in the same file d) All of the alternatives are correct. e) None of the alternatives are correct.	1. d)

2 Which of the following is correct? a) A non-static method cannot access static data b) We cannot use an object to access a static method. c) We cannot use a class to access a static method d) None of the alternatives are correct e) All alternatives are correct	2. d)
3 Overlapping consists in having: (a) two methods with the same name and difference type (void / non void). b) Two methods that are totally equal, being one in the base class and the other in the derived class c) Two methods with the same name but with different parameters. d) None of the alternatives is correct e) All alternatives are correct.	3. b)
4 Consider the following statements: a) In inheritance, a class can inherit (extend) more than one class. b) In inheritance, an interface cannot extend another interface. c) In inheritance, a class can inherit (extends) another class and implements an interface. d) None of the alternatives is correct. e) All alternatives are correct.	4. c)
5 If we declare a method as protected: a) It cannot be accessed outside the class b) Cannot be accessed by a subclass that is in the same package c) Can be accessed by any subclass d) Alternatives (c) and (b) are correct e) Alternative a) is correct and b) is wrong.	5. c)
6 What will be the visibility of a variable if it is declared without public, private or protected? a) private b) protected c) friendly d) public e)None of the alternatives are correct	6. a)
7 Choose the correct alternative a) A class can contain two main () methods. b) We cannot create more than 3 objects of the same class c) The Scanner class belongs to the useful package.	7. c)

d) We can make the extension of a class declared as FINAL e) None of the alternatives	
8 Which one of the following classes belongs to the lang package? a) TextField b) Timer c) Integer d) Random e) Vector	8. c)
9 In multiple inheritance in Java, we can conclude that: (a) it is possible to implement it by using an Interface and a class b) It cannot be implemented in Java c) It is possible to implement it by making the extensions of two classes d) None of the alternatives is correct e) All of the alternatives are correct.	9. a)
10 Which of the following statements is wrong regarding Exceptions: a) There can be several catch statements for a single try block b) It is forbidden to insert more than one try statement inside a program c) The final statement will always be executed, regardless of try and catch d) the throws statement differs from the thow e) points a), d) and c) are correct	10. e)

5.3 Time3 (Traditional)

Laboratory III (Java) – 2019 [DAY SHIFT] TIME 3

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation

1 - When we want to disable a button, we use the method: (a) setDisable (true); b) setEnabled (false); c) disable() (); d) HideMe (true); e) setVisible (false);	Correct answer 1. b)
2 - Consider the btn button. How can we disable it? a) By calling the disable (false) method b) By calling the setEnabled (false) method	2. b)

c) By calling the setState method (false) d) It's impossible to disable it e) Right-click on it	
3 - What does AWT mean? a) All Window Tools b) All Writing Tools c) Abstract Window Toolkit d) Abstract Writing Toolkit e) No alternative	3. c)
4 - What does the following line of code do? Button btn = new Button ("10"); a) Creates a Button object that can contain 10 lines of text. b) Creates the Button object and initializes it with the value 10. c) The code is illegal. d) Creates a Button object with the value 10 in its label e) None of the alternatives is correct.	4. d)
5 Consider the following list box: List lst = new List (); lst.add ("A"); lst.add ("B"); lst.add ("D"); How can we print the first element of the list? a) System.out.print (lst.getItem (0)); b) System.out.print (lst.GetSelected (1)); c) System.out.print (lst.Get (0)); d) System.out.print (lst.return (1)); e) All alternatives are wrong	5. a)
6 The method "getState ()" belongs to the class: (a) AWT b) Checkbox c) Button d) Choice e) Checkbox	6. b)
7 After creating a TextField Txt object, which of the following statements is valid? a) Txt.setEchoChar ('*'); b) Txt.getLine (); c) Txt.init (); d) Txt.setBgColor (Color.Blue);	7. a)

e) None of the alternatives is correct	
8 Which of the following events is applied to a button? a) TextEvent b) ActionButton c) Action d) MouseClass e) All of the previous alternatives are wrong	8. e)
9 How do we use the javap command to check the methods of the Frame class? a) javap javax.awt.Frame b) javap java.Frame c) javap java.awt.event.Frame d) javap java.awt. * e) javap java.awt.Frame	9. e)
10 Which class do we extend when we want to create a swing form? a) Frame b) JFrame c) awt d) Graphics e) Frame	10. b)

Laboratory III (Java) – 2019 [NIGHT SHIFT] TIME 3

Choose one of the alternatives in each of the following questions. This questionnaire is only for the purpose of the research in question and is of no value in the evaluation.

	Correct answer
1 - Which interface do we implement when we want to add an event in a textbox? A) ActionListener B) TextEvent C) Event D) TextField E) TextListener	1. e)
2 - After creating a TextField Txt object, which of the following statements is valid? a) Txt.setEchoChar ('*'); b) Txt.getLine (); c) Txt.init (); d) Txt.setBgColor (Color.Blue); e) None of the alternatives is correct	2. a)
3 - When we want to disable a button, we use the method: (a) setHide (true); b) setVisible (false); c) setEnabled() ();	3. e)

d) HideMe (true); e) setEnabled (false);	
4 - What does the following line of code do? Textfield text = new Textfield (10); a) Creates a text object that contains a String. b) Creates the text object and initializes it with the value 10. c) The code is illegal. d) It creates a text object without any specific characteristic. e) None of the alternatives is correct.	4. e)
5 Consider the following list box: List lst = new List (); lst.add ("A"); lst.add ("B"); lst.add ("D"); How can we print the 0 element of the list? a) System.out.print (lst.getItem (0)); b) System.out.print (lst.GetSelected (0)); c) System.out.print (lst.Get (0)); d) System.out.print (lst.return (0)); e) All alternatives are wrong	5. a)
6 The method "setEchoChar ()" belongs to the class: (a) AWT b) Checkbox c) TextField d) Choice e) Checkbox	6. c)
7 Consider the btn button. How can we disable it? a) By calling the disable (false) method b) By calling the setEnabled (false) method c) By calling the setState method (false) d) It's impossible to disable it e) By right-clicking on it	7. b)
8 Which of the following events is applied to a button? a) TextEvent b) ActionButton c) Action d) MouseClass e) All of the previous alternatives are wrong	8. e)
9 How do we use the javap command to check the methods of the Frame class?	

a) javap javax.awt.Frame b) javap java.Frame c) javap java.awt.event.Frame d) javap java.awt. * e) javap java.awt.Frame	9. e)
10 What does AWT mean? a) All Window Tools b) All Writing Tools c) Abstract Window Toolkit d) Abstract Writing Toolkit e) None of the above	10. c)

Appendix 6. Focus group interview answers

6.1 Iteration 1 – Focus group interview answers

Student	Answers (Portuguese)	Answers (Translated to English)
Student 1	1 - Quando o quadro negro é utilizado, o professor precisa de dar mais dinâmica, na plataforma o professor não deve fazer muita mistura por nós. No quadro negro deve detalhar, fazer um exercício e terminar, em vez de atacar o próximo.	1 - When the blackboard is used, the teacher needs to give more dynamics, in the platform the teacher should not to do much mixing for us. In the blackboard should detail, get an exercise and finish, instead of attacking the next one.
Student 2	2- A plataforma foi um mal necessário, não sei se foi enganada, ou não vi que foi enganada, houve pessoas que receberam programas da Internet, apenas as variáveis mudaram, houve algumas que tiveram programas feios, mas foi a pessoa que o fez. Não podia dizer ao professor que este programa está no site x, não sei se o professor estava a fingir, não estava a ver ou estava a ser enganado.	2- The platform was a necessary evil, I do not know if it was deceived, or did not see that it was deceived, there were people who got programs of the Internet, only the variables changed, there were some who had ugly programs but it was the person who did. I could not tell the teacher that this program is on the site x, I do not know if the teacher was pretending, he was not seeing or was being deceived.
Student 3	3 - Nos métodos de estudo, penso que o professor teve de dar as duas vertentes, dar na mesa se possível para repetir na plataforma para se fixar na mente dos alunos, muitos queixaram-se, porque o professor ensina como se tivesse uma equipa de programadores , Nem todos têm que ... teve que moderar mais, porque dá com uma certa garra, e alguns acabam por ficar para trás, mas isto também se deve à falta de interacção entre grupos. Foi difícil ver como funciona a plataforma, a primeira vez que tive de ver o que se passava, houve colegas que me pediram ajuda, houve uma demonstração da utilização da plataforma.	3 - In the methods of studies, I think that the teacher had to give the two strands, give in the table if possible to repeat on the platform to get fixed in the minds of students, many have complained, because the teacher teaches as if he had a team of programmers , Not everyone has that ... had to moderate more, because it gives with a certain claw, and some end up behind, but this is also due to the lack of interaction between groups. It was difficult to see how the platform works, the first time I had to see what is going on, there are colleagues who asked me for help, there was a demonstration of the use of the platform.
Student 4	4 - Não sei se a culpa foi minha ou do professor, quando introduzi o material na plataforma foi antes de eu entrar, não tínhamos ideia do que estava a	

	acontecer, e o professor explicou como se todos já tivessem entrado na plataforma, Foi difícil depois de ter de correr depois desse tempo, penso que tive de melhorar essa parte.	4 - I do not know if it was my fault or the teacher, when I introduced the material on the platform it was before I came in, we had no idea what was happening, and the teacher explained as if everyone had already entered the platform, It was difficult after having to run after that time, I think I had to improve that part.
Student 5	5 - Na plataforma tive um exercício onde tivemos de partilhar ideias, ninguém estava presente, gostaria de convidar os colegas a trabalhar em equipa, vamos fazer a nossa plataforma como se fosse o Facebook ou o WhatsApp	5 - On the platform I had an exercise where we had to share ideas, no one was present, I would like to invite colleagues to work as a team, let's make our platform as if it were Facebook or WhatsApp
Student 6	6 - Vamos partilhar as nossas ideias na plataforma, em vez de as deixarmos no caderno, diz que se pudermos aceder à quinta do computador, mas não é acessível, o meu tempo começa às 17 horas (não tenho tempo durante o dia), sugiro Tornar a quinta do computador acessível, os testes requerem o que foi ensinado mas no teste requer um nível de compressão mais elevado, deve avaliar o nível de compreensão antes do teste, os testes são individuais sim, mas seria melhor fazer testes de grupo também.	6 - Let's share our ideas on the platform, instead of leaving them in the notebook, says if we can access the computer farm, but it is not accessible, my time starts at 5pm (I do not have time during the day), I suggest Make the computer farm accessible, the tests require what was taught but in the test it requires a higher level of compression, it should evaluate the level of understanding before the test, the tests are individual yes, but it would be better group tests as well.
Student 7	7 - No primeiro dia disse que era inocente na área da informática, mas o professor ensina bem, mas ensina como se eu fosse um perito em programação. Chefe de turma: Muitos dizem que não conseguiam aceder, mas tanto no telefone como no tablet era possível aceder e eu não tive problemas porque a plataforma era muito acessível.	7 - On the first day I said that I was innocent in the area of computer science, but the teacher teaches well, but teaches as if I were an expert in programming. Class boss: Many say they could not access, but both on the phone and tablet it was possible to access and I had no problems because the platform was very accessible.

6.2 Iteration 2 – row data (focus group interview answers)

Group	Answers (Portuguese)	Answers (Translated to English)
Grupo 1		
Student 1	- Plataforma …não tenho muitas críticas	Platform ... I don't have many criticisms
Student 2	- As aulas invertidas são um bom método, em casa temos sempre algo a fazer, o vídeo nem sempre conseguimos baixar internet é cara, é o melhor método, fazemos a aula em casa	- The inverted classes are a good method, at home we always have something to do, the video we can not always download internet is expensive, is the best method, we do the class at home
Student 3	- Plataforma é o melhor método, devia melhorar no vídeo, conteúdo e mais preparações para o teste, o sistema por vezes cai, não muito mais a dizer na melhoria das aulas	- Platform is the best method, should improve in the video, content and more test preparations, the system sometimes crashes, not much more to say in improving the classes
Student 4	- Houve boa interação, mas a plataforma o docente tinha que criar mais jogos ligados a matéria, a sala tinha de melhorar, pois alguns computadores não funcionam	There was good interaction, but the platform, the teacher had to create more games linked to the subject, the room had to improve, because some computers do not work
Grupo 2		
Student 5	- Plataforma foi eficiente, pois permite rever as matérias para melhor aprendizagem e compreensão, pouca gente acedia a plataforma, por falta de internet e meios para acedê-la e por vezes estava indisponível.	- The platform was efficient, because it allows us to review the subjects for better learning and understanding, few people accessed the platform, for lack of internet and means to access it and sometimes it was unavailable.
Student 6	- Plataforma boa acessível e eficiente, deu pra perceber, podíamos ver varias vezes, tinham exercícios e exemplos, eram mais fácil e melhor. Gostaria que os próximos vídeos a voz fosse bem audível, a plataforma estava não acessível, e não tínhamos internet.	- The platform was efficient, because it allows us to review the subjects for better learning and understanding, few people accessed the platform, for lack of internet and means to access it and sometimes it was unavailable.
Student 7	- a plataforma foi um bom meio de aprendizagem, tive muitas dificuldades a enviar as actividades no sistema, muitos colegas tiveram dificuldades em aceder, poucas pessoas estavam a interagir na sala, sugestão: criar	The platform was a good learning method, I had many difficulties sending the activities in the system, many colleagues had difficulties to access, few people were interacting in the room, suggestion: create longer video

	vídeo aulas mais longas pois iria facilitar, em vez de abrir um e depois abrir outro pois a internet era lenta.	lessons because it would facilitate, instead of opening one and then open another because the internet was slow.
Student 8	A plataforma foi um dos métodos de aprendizagem melhor, com os vídeos aprendia melhor, repetia tanto até perceber, tive muitas dificuldades em baixar os vídeos e de enviar os trabalhos na plataforma. Plataforma: - videos longos, aumento do tom de voz, melhoria no login na plataforma	The platform was one of the best learning methods, with the videos I learned better, I repeated so much until I understood, I had many difficulties in downloading the videos and sending the works on the platform. Platform: - long videos, increased tone of voice, improved platform login
Grupo 3		
Student 9	Pra mim a plataforma ajudou bastante, mas por vezes nos esquecemos da aula na sala ao chegar encasa nos esquecemos, na plataforma podemos repetir. Testes eram muito apertados, devia haver um tempo dedicado aos exercícios	For me the platform helped a lot, but sometimes we forget the class in class, when we get home we forget, on the platform we can repeat it. Tests were too tight, there should be time dedicated to exercises
Student 10	Minha opinião é boa, mas inquietação é aqueles alunos como eu que não tem computador encasa, na escola computer farm fechado, internet oscilando, é difícil, mas é bem vindo, mais um método que permite dinamizar o ensino.	My opinion is good, but the concern is for those students like me who don't have a computer at home, at school computer farm closed, internet oscillating, it is difficult, but it is welcome, one more method that allows us to make teaching more dynamic.
Student 11	- a plataforma foi eficaz, ajudou bastante, porque há matéria que é possível rever (no vídeo), as aulas invertidas não são eficazes assim, pois acaba-se não entendendo a matéria por que precisa de um auxilio do que vai estudar.	- The platform was effective, it helped a lot, because there are subjects that you can review (in the video), the inverted classes are not so effective, because you end up not understanding the subject because you need an aid of what you are going to study.
Student 12	Meu ponto de vista as aulas invertidas foram boas, a plataforma foi por uma parte positiva pois ajudou muito, na sala de aulas nem sempre era fácil perceber, a parte negativa era complicado para algum de nos ter acesso a plataforma por não ter internet ou meio para aceder, o	My point of view, the inverted classes were good, the platform was positive because it helped a lot, in the classroom it was not always easy to understand, the negative part was that it was complicated for some of us to have access to the platform because we did not have internet or means to access it, the computer farm was

	computer farm poucas vezes era aberto. Proposta para os próximos anos é que o docente fizesse na plataforma algo mais produtivo, mais vídeos, mais PDFs, onde o estudante teria opção de escolha.	rarely open. The proposal for the next years is that the teacher should do on the platform something more productive, more videos, more PDFs, where the student would have a choice.
Grupo 4		
Student 13	- é um meio de estudo muito avançado pois pra aceder é preciso ter acesso a internet e a internet é cara em Moçambique, mas é boa e leva o estudante a pesquisar, há colegas que pesquisam muito e temos que estar ao mesmo nível. Sugestão: redirecionar a plataforma a uma app android As aulas em geral foram boas	- is a very advanced way of study because to access it you need internet access and internet is expensive in Mozambique, but it is good and it leads the student to research, there are colleagues who research a lot and we have to be at the same level. Suggestion: redirect the platform to an android app The classes in general were good
Student 14	- o uso da platorma foi boa, o estudante torna-se auto aprendiz, alem de aceder a plataforma este deve ler também, ir a procura da matéria. Sugestão: deveríamos ter um fórum onde poderíamos discutir ideias entre estudantes, devia-se adicionar novos recurso para que os estudantes publiquem seus conhecimentos A forma de avaliação devia ser variada, os testes escritos não são suficientes, talvez o dialogo ou mostrando novas ideias, testes orais também. Poderiam ser também os estudantes a lecionar as aulas em alguns casos, ser o estudante a frente da aula	- The use of the platform was good, the student becomes a self-learner, besides accessing the platform he has to read and search the subject. Suggestion: we should have a forum where we could discuss ideas between students, we should add new resources for students to publish their knowledge The form of evaluation should be varied, written tests are not enough, maybe dialogue or showing new ideas, oral tests too. It could also be the students teaching the classes in some cases, be the student in charge of the class
Student 15	Aulas invertidas são de fácil compreensão, Sugestão: docente colocasse mais coisas na plataforma, não ficar muito tempo sem publicar novas coisas. PDS ou vídeo aulas frequentes dariam mais animo a entrar sempre. Aulas presenciais deveriam ser prácticas, só deveríamos resolver exercícios, e tirar duvidas, em vez de procurar dar aulas resumidas e	Inverted classes are easy to understand, Sugestão: docente colocasse mais coisas na plataforma, não ficar muito tempo sem publicar novas coisas. I would also like to thank the students for their support and encouragement. The classes should be practical, we should only solve exercises and solve doubts, instead of trying to give summarized classes and

	depois resta pouco tempo pra práctica.	then there is little time left for practice.
Student 16	- As aulas invertidas foram boas, ajudam a ter um novo recurso de aprendizagem, é possível assistir varias vezes, as aulas presenciais foram boas, conseguiu entender a todos, foram muito puxadas, Sugestão: melhorar a plataforma, a aula nova devia aparecer no topo da página, assim nota-se logo que há novo conteúdo. Aulas presenciais os trabalhos foram muitas	- The inverted classes were good, it helps to have a new learning resource, it is possible to watch it several times, Suggestion: improve the platform, the new class should appear at the top of the page, so you can see the new content right away. Suggestion: improve the platform, the new class should appear at the top of the page.
Student 17	- aulas invertidas achei mais interessante, podíamos assistir os vídeos no momento calmo sem distração (o docente não perdia o foco no vídeo),no tradicional o docente pode se desviar da aula durante a aula. - Mais exercícios practicos, o método de avaliação acho que não devia exagerar muito nos testes (3 testes no máximo), os trabalhos eram de mais (40 exercícios).	- I found inverted classes more interesting, we could watch the videos in a calm moment without distraction (the teacher did not lose focus on the video), in the traditional class the teacher could deviate from the class during the class. - More practical exercises, the method of evaluation I think should not exaggerate too much in the tests (3 tests maximum), the works were too much (40 exercises).
Grupo 5		
Student 18	- Ajudam o estudante a ter aulas a distancia, a qualquer momento, a qualquer lugar. - propõe que as aulas continuem - Aulas invertidas: a tradicional tem desvantagem pois o estudante as vezes tem receio de perguntar algo ao docente, quando feitas na plataforma pode repetir o vídeo, ou pode vir a sala e colocar a dúvida.	- Helps the student to take lessons at a distance, anytime, anywhere. - proposes that the classes continue - Inverted classes: the traditional class has a disadvantage because the student is sometimes afraid to ask the teacher something, when they are done on the platform they can repeat the video, or they can come to class and ask questions.
Student 19	- Ajudam ao estudante, facilitam a perceção, são lecionadas a qualquer tempo desde que tenha internet, pode voltar a assistir, em caso de duvidas havia o docente. - as aulas invertidas: as tradicionais nem todas são boas pois o estudante pode não fazer presente a sua duvida ao docente temendo represálias, nas invertidas pode recuar o vídeo,	- They help the student, facilitate perception, are taught at any time as long as there is internet, the student can re-watch, and in case of doubt there was the teacher. - the inverted classes: the traditional ones are not all good because the student may not present his doubts to the teacher for fear of reprisals, in the inverted ones, he can go back to the video,

	seria melhor não descartar as aulas invertidas.	it would be better not to discard the inverted classes.
Student 20	- foram boas, dificuldades quando a plataforma na tive acesso a internet, sugeria que continuasse assim. - as aulas invertidas:	- They were good, difficulties when the platform I did not have access to internet, I would suggest that it continues like this. - the inverted classes:
Grupo 6		
Student 21	- Não achei mal as aulas invertidas, ajudavam, tínhamos mais percepcao na plataforma, era fácil vendo, na compilação foi possível ver os erros de compilação, não tenho nenhuma proposta de melhoria. - As aulas foram boas, as vezes os exemplos não foram bem claros	- I didn't find bad the inverted classes, they helped, we had more percepcao in the platform, it was easy seeing, in the compilation it was possible to see the compilation errors, I don't have any improvement proposal. - The classes were good, sometimes the examples were not very clear
Student 22	- As aulas na plataforma são de mais valia porque tenho mais tempo de ver os vídeos de acordo com a minha disponibilidade, nos vídeo deixou escapar alguns erros que nos ajudam a perceber alguns erros, agora que temos o computer farm disponível, Proposta: aderir as aulas na plataforma e vir as aulas para expor as duvidas	- The classes in the platform are of more value because I have more time to see the videos according to my availability, in the videos let escape some errors that help us to understand some errors, now that we have the computer farm available, Proposal: join the classes in the platform and come to the classes to expose the doubts
Student 23	- As aulas foram boas, pois tenho preguiça na leitura, As aulas forma boas, os exercícios ajudaram	- The classes were good, because I have laziness in reading, The classes were good, the exercises helped.
Student 24	- a plataforma é de maior valia, aprendemos muito, gostaria que continuasse, podíamos assistir varias vezes mas na aula não. Sugestão: sugerir a fazer quase todas as aulas la na plataforma.	- The platform is of great value, we learned a lot, I would like it to continue, we could watch it several times but not in class. Suggestion: suggest doing almost all the classes there on the platform
Student 25	- Não temos a mesma forma de aprender, as plataforma ajudou na diferença de cada um, alguns puderam ver mais com os vídeos e perceber mais, eu também me ajudou, pois assisti os vídeos, dava pra perceber o docente explicava a teoria e depois dava	- We do not have the same way of learning, the platform helped the difference of each one, some could see more with the videos and realize more, I also helped me, because I watched the videos, I could see the teacher explained the theory and then gave a

	um problema pra resolver, assim conseguia perceber. - Melhorar o som nos vídeos, acesso a internet, nem todos tem acesso a internet encasa, e na UP a internet é lenta, assim era difícil aceder. Computer farm não está acessível todos os dias.	problem to solve, so I could understand. - Improve the sound in the videos, internet access, not everyone has access to internet at home, and at UP the internet is slow, so it was difficult to access. Computer farm is not accessible every day.
Grupo 7		
Student 26	- melhoradas porque o estudante tem a possibilidade de estudar encasa e do jeito que quiser (a comer, a escutar musica, etc.),o estudante tem mais capacidade de percepcao, o nível de concentração é diferente, há mais qualidade e o aproveitamento, tudo fica mais fixe, O que achas que devia melhorar? - se o docente pudesse melhorar mais a qualidade do vídeo e o som do vídeo,	- They are improved because the student has the possibility to study at home and in the way they want (eating, listening to music, etc.), the student has more perception capacity, the concentration level is different, there is more quality and the use, everything is cooler, What do you think should be improved? - if the teacher could improve more the quality of the video and the sound of the video,
Student 27	- diferente, evolução fora do normal, a plataforma apresenta uma vantagem, caso não se percebe posso recuar, pois uma aula normal é impossível faze-lo, caso queira explicar a uma outra pessoa é possível pois ainda tenho a aula armazenada, mesmo da qui a 4 anos, O que achas que devia melhorar? - no momento que corre o vídeo há muita dificuldade de perceber algumas partes, eu tenho que usar colunas para ouvir bem, melhorar essa parte.	- The platform has an advantage, if you do not understand I can go back, because a normal class is impossible to do so, if I want to explain to another person it is possible because I still have the class stored, even from here to 4 years ago, What do you think I should improve? - when the video is playing it is very difficult to understand some parts, I have to use speakers to hear well, improve this part.
Student 28	- não vou aumentar nada do foi dito, este modelo/forma de estudos foi muito bom, contribuiu no tempo de aprendizagem pois é possível recapitular a aula passada, pois as aulas ficam armazenadas O que achas que devia melhorar? - primeiramente na edição dos vídeos, todos os vídeos tem problema de som, a voz é muito baixo, devia-se corrigir, na plataforma há problemas ao baixar os ficheiros.	- I am not going to increase anything that has been said, this model/form of studies was very good, it contributed in the learning time because it is possible to recapitulate the past lesson, because the lessons are stored What do you think should be improved? - First of all in the editing of the videos, all the videos have a sound problem, the voice is very low, it should be corrected, in the

		platform there are problems when downloading the files.
Student 29	- A plataforma faz com que os estudantes que não entram na sala podem assistir, mesmo não aparecendo na aula por motivos de forca maior - Acessibilidade, não pudemos mudar o nosso password. Se a senha não fosse a padrão, os outros colegas podem entrar na sua conta e baixar o trabalho dos outros	- The platform makes it so that students who do not enter the room can watch, even if they do not appear in class for reasons of force majeure - Accessibility, we could not change our password. If the password was not the default one, other colleagues could log into their account and download the work of others
Student 30	- Privatizar o acesso a plataforma, cada um puder trocar a sua senha.	- Privatize the access to the platform, so that everyone can change their password.
Grupo 7		
Student 31	-o problema que me inquieta é o facto de acelerar com os conteúdos, há alunos que não conseguem ultrapassar/assimilar os conteúdos com antecedência, o docente não dá essa oportunidade pra eles	-the problem that worries me is the fact that it accelerates with the contents, there are students who cannot overcome/assimilate the contents in advance, the teacher does not give them this opportunity
Student 32	- Sobre as aulas invertidas: o docente não devia dar uma explicação muito resumida, devia dar, devia ser mais profunda para o estudante conseguir fazer uma comparação da matéria que está na plataforma com e a matéria pratica, assim facilitaria a compreensão	- About the inverted classes: the teacher should not give a very summarized explanation, he/she should give a deeper one, so that the student can make a comparison of the subject that is on the platform with the practical subject, thus facilitating the understanding
Student 33	- a plataforma veio melhorar pois a interação é individualizada, mas nem todos os colegas tem acesso a plataforma, nem todos tem maquinas, é difícil ver a informação antes pra de forma resumida ser discutida na sala, se uma vez por semana tivéssemos aulas num laboratório com máquinas em bom estado pra quem não tiver laptop poder usar um desktop isso poderia vir a melhorar, quanto a explicação que não seja de forma resumida mas sim profunda, pois nem todos percebem quando for de forma individualizada.	- The platform has improved because the interaction is individualized, but not all colleagues have access to the platform, not all have computers, it is difficult to see the information before it is discussed in a summarized way in the classroom, if once a week we had classes in a lab with machines in good condition for those who do not have a laptop to use a desktop, this could improve.

6.3 Iteration 3 - row data (focus group interview answers)

Group	Answers (Portuguese)	Answers (Translated to English)
Voice 003 (group 1)		
Student 1	Sim, consegui aceder a todas as classes, utilizando a plataforma, mais simples, tenho comp, também utilizei um telefone para aceder à plataforma. Vídeos via computador. Investimento: foi bom.	Yes, I was able to access all classes, using the platform, simpler, I have comp, I also used a telephone to access the platform. Videos via computer. Investment: it was good.
Student 2	Consegui aceder, utilizando a plataforma e o WhatsApp (era difícil aceder via célula, por isso utilizei o WhatsApp). A aula virtual ajudou, facilitou a compreensão do assunto, assisti a vídeos e fiz um resumo. Impressão: mais interactivo, permite assistir à aula em qualquer altura. Oportunidade de retirar o vídeo, na sala o aluno não tem a capacidade de pedir ao professor para repetir (represálias professor/colegas)	I was able to access, using platform and WhatsApp (it was difficult to access via cell, so I used WhatsApp). Virtual Class helped, easier to understand the subject, watched video and summarized. Impression: more interactive, allows to attend the class at any time. Opportunity to retreat the video, in the room the student does not have the ability to ask the teacher to repeat (teacher / colleagues reprisals)
Student 3	Cheguei às aulas, usei whtaaap, inversão das aulas: tínhamos mais espaço para expor as dúvidas sem o professor. Não consegui submeter o resumo na plataforma. Acabei de realizar as actividades no nível 1.	I got to the classes, I used whtaaap, inversion of the classes: we had more space to expose the doubts without the teacher. I could not submit the abstract on the platform. I just performed the actives on level1.
Voice 005 (group2)		
Student 4	Não consegui aceder a todas, usei a plataforma e WhatsApp, os vídeos consegui via flash, assistia via computador em casa. Inverter as aulas: foi bom, ficava fácil ir a sala enquanto tínhamos noção da matéria,	I couldn't access them all, I used the platform and WhatsApp, the videos I got via flash, I watched them on the computer at home. Invert the classes: it was good, it was easy to go to the classroom while we had a notion of the subject,
Student 5	Consegui aceder aos videos via flash, assistia no laptop encasa, tambem via whatsapp, as aulas invertidas permitiam assistir n vezes, as presenciais ajudavam a esclarecer as duvidas. Não consegui chegar ao nível III da plataforma (pouco tempo)	I was able to access the videos via flash, watch them on my laptop, also via whatsapp, the inverted classes allowed me to watch them n times, the face-to-face ones helped me to clarify my doubts. I could not reach level III of the platform (not much time).
Student 6	Não consegui aceder a todas as aulas, a última não consegui ter o vídeo, usava WhatsApp, assistia os vídeos através do computador encasa, inverter as aulas achei	I couldn't access all the classes, the last one I couldn't get the video, I used to use WhatsApp, I watched the videos through my computer, inverting the classes I

	positivo, tem a parte do aluno – preguiça em não fazer, assistir só não leva a tanto, melhorei pois tive a possibilidade de repetir os vídeo em caso de erro no programa.	found positive, there is the student's part - laziness in not doing, watching only doesn't lead to that much, I improved because I had the possibility to repeat the videos in case of error in the program.
Voice 006		
Student 7	Não consegui fazer todas aulas invertidas, Internet problema, usei a plataforma, mas não assistia os vídeos, usava para completar as tarefas, os colegas partilhavam os vídeos comigo. Inverter: cultiva o espírito de estudar, vem a sala com noção e há maior interacção, pra mim notei avanço na cadeira de programação. Consegui completar todos os níveis, são bons porque testam a capacidade	I could not do all flipped classes, internet problem, I used the platform, but I did not watch the videos, I used to complete the tasks, the colleagues shared the videos with me. Invert: cultivates the spirit of studying, comes the room with notion and there is greater interaction, for me I noticed advance in the subject of programming. I managed to complete all the levels, they are good because they test your capacity
Student 8	Consegui aceder a todas as aulas, usava computador usando a Internet da UP e meu computador, inversão: muito bom, vem a aula com noção, apresenta ao docente. Havia problema da Internet na UP, pois era difícil aceder em alguns dias.	I was able to access all the classes, I used computer using the UP Internet and my computer, inversion: very good, comes the class with notion, presents to the teacher. There was problem of Internet at UP, because it was difficult to access on some days.
Student 9	Não consegui, primeiro sem telefone e meu laptop tinha problema. Usei o computador. Aulas invertidas: gostei, porque podia estudar a qualquer hora, melhorei na programação.	I couldn't, first no phone and my laptop had problem. I used the computer. Inverted classes: I liked it, because I could study at any time, I improved in programming.
Voice 007		
Student 10	Não consegui aceder a todas, via WhatsApp, tudo era via WhatsApp, consegui assistir os vídeos, Inversão das aulas, Aulas invertidas: positiva, não fica a espera do professor, via os comentários dos colegas, interactividade e competição.	I could not access them all, via WhatsApp, everything was via WhatsApp, I could watch the videos, Inversion of classes, Inverted classes: positive, does not wait for the teacher, via the comments of colleagues, interactivity and competition.
Student 11	Consegui aceder as aulas, não usei a plataforma, usei os vídeos do WhatsApp e outros vídeos (Youtube) e PDF. Inversão: gostei, uma outra forma, eu não me senti muito à-vontade.	I was able to access the classes, I didn't use the platform, I used the WhatsApp videos and other videos (Youtube) and PDF. Inversion: I liked it, another way, I didn't feel very comfortable.
Student 12	Não tinha meios para aceder a plataforma, usava WhatsApp e via	I had no means to access the platform, I used WhatsApp and watched videos on my phone.

	vídeos no telefone. Aulas invertidas: gostei, permitia repetir.	Inverted classes: I liked it, it allowed repeating.
Voice 008		
Student 13	Consegui fazer todas aulas, usei computador usando megas e usando Internet da UP, Aulas invertidas: facilitou, o docente esta comigo encasa e na escolha.	I managed to do all classes, I used computer using megas and using UP's Internet, Inverted classes: facilitated, the teacher is with me encasa and in the choice.
Student 14	Não consegui aceder a todas aulas invertidas, foi complicado aceder a plataforma (difícil. Internet), usei i WhatsApp. Na plataforma ao aceder tinha que fazer todas actividades do nível I para fazer o nível II. Aulas invertidas: falta me habituar.	I could not access all the inverted classes, it was complicated to access the platform (difficult. Internet), I used i WhatsApp. In the platform to access had to do all activities of level I to do the level II. Inverted classes: I still need to get used to it.
Student 15	Acedi a todas aulas na plataforma, com o telemóvel. Inversão: O aluno vinha a sala com conhecimento prévio	I accessed all classes on the platform, with my mobile phone. Inversion: the student came to class with prior knowledge.
Voice 009		
Student 16	Consegui aceder a todas as aulas invertidas, via telefone, tive dificuldades de submeter o resumo na plataforma (não vinha opção pra submeter), acabei usando o WhatsApp pra publicar o resumo. Inversão: Boa iniciativa, deixa o estudante livre pra pensar, testar encasa e questionar o docente na aula.	I managed to access all the inverted classes, via phone, I had difficulties submitting the summary on the platform (there was no option to submit), I ended up using WhatsApp to publish the summary. Inversion: Good initiative, leaves the student free to think, test and question the teacher in class.
Student 17	Consegui, mas tive dificuldades em anexar o resumo, usando a internet de casa. Inverte: interagimos mais com o docente, como se a aula fosse nossa, novas descobertas.	I succeeded, but I had difficulties to attach the abstract, using the internet at home. Inverting: we interact more with the teacher, as if the class was ours, new discoveries.
Student 18	Consegui, via telefone acedendo na plataforma, a Aulas invertidas: ajudou pois nem sempre tinha possibilidade por questões de saúde	I managed, via telephone accessing the platform, to Inverted classes: it helped because I didn't always have the possibility due to health issues.
Voice 010		
Student 19	Consegui fazer as aulas, tive problema ao submeter o resumo, tive que vir a UP pra aceder ao Wireless. Depois postei no WhatsApp. Inverter as aulas: uma boa maneira porque encasa com todo conforto.	I managed to do the classes, had problem submitting the abstract, had to come to UP to access Wireless. Then I posted on WhatsApp. Invert the classes: a good way because it houses with all comfort.
Student 20	No meu caso, só consegui aceder as últimas aulas invertidas, nas primeiras tive dificuldades via telefone, depois pedi emprestado o computador. Cada	In my case, I could only access the last inverted classes, in the first ones I had difficulties over the phone, then I borrowed the

	pergunta dá tempo pra investigar, acaba aprendendo outras coisas.	computer. Each question gives you time to investigate, you end up learning other things.
Student 21	Usei o telefone, WhatsApp (o telefone ficava lento ao aceder a plataforma)	I used the phone, WhatsApp (the phone was slow when accessing the platform)
Voice 011		
Student 23 Student 24 Student 25	Não 100%, o sistema não estava acessível, usei via flash. Pra mim consegui todas aulas invertidas usando o WhatsApp. Também consegui via plataforma, mas tinha dificuldades por falta de Megas, optei já o WhatsApp. Percepção: Aulas invertidas: A percepção foi boa, da mais interacção, rever o mesmo vídeo, os vídeos eram muito claros e mais que a aula. Pra mim foram muito boas, podia recuar e compreender.	Not 100%, the system was not accessible, I used via flash. For me I got all classes reversed using WhatsApp. I also got it via platform, but I had difficulties due to lack of Megas, I opted for WhatsApp already. Perception: Flipped classes: The perception was good, more interaction, review the same video, the videos were very clear and more than the class. For me they were very good, I could go back and understand.
Voice 012		
Student 26 Student 27 Student 28	Consegui usando o WhatsApp, nem sempre tinha computador, Eu usei mais os vídeos via flash, via no computador encasa. Por vezes via computador (plataforma), mas há dias que não conseguia (firewall). Percepção: -Inverter: cria mais interesse e fácil entendimento entre o docente e aluno (vinha com a aula pronta). - Aulas inverter: ajudam por causa das imagens e vídeos, em caso de duvida eu via o vídeo encasa.	I managed using WhatsApp, I didn't always have a computer, I used more the videos via flash, via the computer encasa. Sometimes via computer (platform), but some days I couldn't (firewall). Perception: -Invert: creates more interest and easy understanding between the teacher and student (came with the lesson ready). - Invert classes: they help because of the images and videos, in case of doubt I would see the video enclosed.
Voice 013		
Student 29 Student 30 Student 31	Consegui completar todas actividade, usei internet encasa e telefone. Também usei WhatsApp. Não consegui, roubaram telemóvel, meu PC teve problemas, pedi emprestado telemóvel de colegas e fazia apanhados no caderno.	I managed to complete all activities, used encasa internet and phone. I also used WhatsApp. I couldn't do it, my phone was stolen, my PC had problems, I borrowed colleagues' phones and got caught up in the notebook.

	Não consegui completar todas actidades da plataforma, via computadores dos colegas. Videos na Plataforma são maiores que no WhatsApp. Não consegui aceder a plataforma, usei WhatsApp. Reclamo: os vídeos da plataforma eram muito grandes (muitos megas), deveria haver diferentes tamanhos. Percepção: Classes invertidas: bem-vindo, permite estudar encasa (é obrigado a estudar encasa) Aulas compridas são tediantes, ficaram curtas. Níveis entre actividades: desafia a chegar a outros níveis porque os colegas conseguiram, Aulas invertidas: iniciativa boa, permite interacção entre prof-estudantes, em vez do professor despejar e o aluno consumir. Os mais preguiçosos acabaram tendo possibilidade, de fazer a aula, e no dia da aula tinham que falar alguma coisa.	I couldn't complete all the activities on the platform, via colleagues' computers. Videos on the Platform are bigger than WhatsApp. I couldn't access the platform, I used WhatsApp. Complaint: the videos on the platform were too big (many megs), there should be different sizes. Perception: Inverted classes: welcome, allows you to study encasa (you are forced to study encasa). Long classes are tedious, they got short. Levels between activities: challenging to reach other levels because colleagues have succeeded, Inverted classes: good initiative, allows interaction between prof-students, instead of the teacher pouring out and the student consuming. The laziest ended up having the possibility, to do the class, and on the day of the class they had to say something.
Voice 014		
Student 32	Aulas invertidas: tive dificuldades em aceder, partilha pelos colegas. Seria melhor que a plataforma notificasse em caso de novo trabalho. Todos nos acedemos via flash ou via telefone, usamos computador encasa. Percepção: Possibilidade de publicar perguntas e debater na sala foi boa. Foi boa, a pergunta debatida na classe foi boa. As perguntas não deviam ser obrigatórias, pois por vezes não havia duvidas e tivemos que fazer perguntas por fazer.	Inverted classes: I had difficulties accessing, sharing by colleagues. It would be better if the platform notified in case of new work. We all access via flash or via phone, use computer encasa. Perception: Possibility to post questions and debate in the room was good. It was good, the question debated in class was good. The questions should not be compulsory, because sometimes there was no doubt and we had to ask questions for the sake of asking.
Voice 015		

Student 33	Usava computador via internet, Usava PC de casa e internet Sou novo estudante, ainda estou vendo os vídeos Percepção: Boa iniciativa, nos dias sem aulas podemos aceder aos vídeos, ter noção básicas pra pesquisar mais Muito importante, pois, na sala há medo/timidez de falar. Permite o aluno ter mais prática sobre a matéria O docente vai directo ao assunto Não consegui chegar ao nível III, ainda estamos no primeiro nível.	I used to use computer via internet, Used home PC and internet I am a new student, still watching the videos Perception: Good initiative, on days without classes we can access the videos, have basic notion to research more Very important, because in the classroom there is fear/timidity to speak. Allows the student to have more practice on the subject The teacher goes straight to the point I couldn't reach level III, we are still at the first level.
Student 34	Sim, através do telefone, respondia, Usei o WhatsApp e telefone, Sim, usei telefone, usei mais o computador. Não devia ser obrigatório submeter questões. Usei flash, telefone ou computador para assistir. Percepção: Foi positivo, podemos assistir a aula sem a presença do docente. Foi bom, é preferível ir à sala de aulas só para apresentar dúvida, Permite repetir as aulas	Yes, through the phone, I would answer, I used WhatsApp and phone, Yes, used phone, used computer more. It should not be mandatory to submit questions. I used flash, phone or computer to watch. Perception: It was positive, we can watch the class without the presence of the lecturer. It was good, it is preferable to go to the classroom just to present doubt, It allows to repeat the class.
Voice 017		
Student 35, Student 36, Student 37	Consegui fazer as aulas todas usando o flash (dificuldades de aceder a Internet). Usei o WhatsApp pra baixar e depois usava o computador pra ver Usava computador e Internet encasa pra aceder a plataforma Consegui via telefone, dificuldades em submeter o resumo (usando a Internet) Percepção Inversão é bem vinda, oportunidade de ver sozinho as aulas, venho a escola so pra tirar as duvidas. Inversão: é mais interativa, no final de cada nível devia haver avaliação.	I managed to do all the classes using flash (internet access difficulties). I used WhatsApp to download and then used the computer to watch I used computer and internet to access the platform I managed to do it via phone, difficulties in submitting the summary (using internet) Perception Inversion is welcome, opportunity to see the classes by myself, I come to school only to clarify doubts.

	É uma forma mais interactiva de aprender, não é fácil entender uma nova matéria na sala, fica fácil aprender encasa e depois na sala apresentar as duvidas.	Inversion: it is more interactive, at the end of each level there should be an evaluation. It is a more interactive way of learning, it is not easy to understand a new subject in the classroom, it is easy to learn at home and then present your doubts in class.

6.3 Iteration 4 (pilot study)

Group	Answers (Portuguese)	Answers (Translated to English)
Day Shift recordings		
Record2REG (1).amr		
Student 1	Consegui aceder e conlcuir a todas aulas Acedi via computador Abri os videos,assisti as aulas e no fim tinha um exercicio que tinha que fazer. Impressao sobre o método das aulas invertidas: Duma forma ajuda, no modelo tradicional o docente tinha a oportunidade de explicar tudo e mais alguma coisa (dar mais vagar) e os colegas poderiam dar sugestoes e enriquecer a aula, na aula ivertida não há interaccao directa entre estudante e docente.É dificil esperar pela aula para fazer a pergunta. Na sala já não se repete a aula, apenas avançamos ou fazemos o levantamento das questões, eu acho que acaba tirando a garra que tinhamos para estudar, estudamos mais através da pressão pela presença do docente na sala, as aulas invertidas são boas, mas o docente devia dar um pequeno breathing para que possamos intervir. Consegui chegar ao nivel III. NTalvez consegui obter 3 trofeus. Nào tive problemas em aceder a plataforma.	I was able to access and complete all classes I accessed via computer I opened the videos, watched the classes and at the end I had an exercise I had to do. Impression on the method of flipped classes: In a way it helps, in the traditional model the teacher had the opportunity to explain everything and anything else (take more time) and colleagues could give suggestions and enrich the class, in the flipped class there is no direct interaction between student and teacher. It is difficult to wait for the class to ask the question. In the classroom, the class is no longer repeated, we just advance or survey the questions, I think it ends up taking away the courage we had to study, we study more through the pressure of the teacher's presence in the room, the inverted classes are good, but the teacher should give a little breathing so we can intervene. I managed to get to level III. Maybe I managed to get 3 trophies. I had no problems accessing the platform.

Student 2	Consegui aceder as aulas, usando o computador. As aulas invertidas foram boas, ajudavam a compreender, estava sozinho. O método é bom e não é bom, estavmos limitados a plataforma,depois acabou, dia seguinte era nova aula, outros corriam para fazer os desafios. Consegui chegar ao nivel III e obtive 3 trofeus. Não tive qualquer dificuldade.	I was able to access the classes using the computer. The flipped classes were good, they helped to understand, I was alone. The method is good and not good, we were limited to the platform, then it ended, the next day it was a new class, others ran to do the challenges. I managed to reach level III and got 3 trophies. I didn't have any difficulties.
Student 3	Consegui fazer todas as aulas invertidas, usando WhatsApp e o computador, usei o computador e telefone como modem. É bom, possibilita pressão à distância, embora haja falta de pressao do docente pois o estudante só estuda perante a presença do docente, consegui chegar ao nivel II, consegui 2 trofeus. Não houve difucldades	I managed to do all the classes inverted, using WhatsApp and the computer, I used the computer and phone as a modem. It's good, it allows distance pressure, although there is a lack of pressure from the professor because the student only studies in the presence of the professor, I managed to reach level II, I got 2 trophies. there were no difficulties
Student 4	Consegui fazer todas aulas invertidas, usando Whatsapp (smartphone), são boas, ajudam-nos a abrir a mente, consegui chegar ao nível III, tive 3 trofeus. Tive dificuldades,por estar usando o telefone, por vezes não consegui ver os videos ou submeter, era dificil passar para o nivel seguinte. Consegui chegar ao nivel iII.	I managed to do all the classes inverted, using Whatsapp (smartphone), they are good, they help us to open our minds, I managed to reach level III, I had 3 trophies. I had difficulties, because I was using the phone, sometimes I couldn't see the videos or submit, it was difficult to move to the next level. I managed to get to level III.
Recoder2REG 2 (2).m4a		
Student 5	Consegui sim, na base do computador, A minha impressão é: Interessante. Consegui chegar ao nível III, obtive 3 trofeus. Não tive dificildades	Yes, I did, on the basis of the computer. My impression is: Interesting. I managed to reach level III, got 3 trophies. I didn't have difficulties
Student 6	Sim, na base do computador. Impressao: Boas, interessantes e estimulantes. Consegui chegar ao nivel III, obtive 3 trofeus.	Yes, at the base of the computer. Impression: Good, interesting and stimulating. I managed to reach level III, got 3 trophies.
Student 7	Sim, na base do computador. Impressao: Boa. Consegui chegar ao nivel III, não sei quantos trofeus. Não tive dificildades	Yes, at the base of the computer. Impression: Good. I managed to reach level III, I don't know how many trophies. I didn't have difficulties

Student 8	Sim consegui, através do computador. Impressao: O método é melhor do que o tradicional. Conseguichegar ao nivel 3. Não sei quantos trofeus Não tive dificildades	Yes I did, through the computer. Printing: The method is better than the traditional one. I managed to reach level 3. I don't know how many trophies I didn't have difficulties
Student 9	Sim consegui, atraves do computador. Impressao: foi boa, mais facil aprender, posso rever os videos. Consegui chegar ao nivel III. Acedi a todos trofeus. Dificuldades usando a Internet da Faculdade, mas usando a minha Internet não.	Yes I did, through the computer. Impression: it was good, easier to learn, I can review the videos. I managed to get to level III. Accessed all trophies. Difficulties using the College Internet, but not using my Internet.
Recoder2REG 2 (3).m4a		
Student 10	Sim consegui aceder as aulas usando Whasapp (smartphone). As gamificadas foi no bom sentido. Conseguiamos estudar encasa, acesso constante a materia e na sala aprimorar o que aprendemos antes. Não sei quantos trofeus adiquiri porque acedia via WhatsApp, mas cheguei ao nivel III porque resolvi todos exercicios que o docente deixou.	Yes I was able to access the classes using Whasapp (smartphone). The gamified ones were in a good way. We were able to study at home, constant access to material and in the classroom to improve what we learned before. I don't know how many trophies I acquired because I accessed it via WhatsApp, but I reached level III because I solved all the exercises that the teacher left.
Student 11	Consegui aceder a todas as aulas atraves do computador. Impressao: Boa, permitiram aceder a aula a qualquer momento, facilitava a nossa vida. Por outro lado a desvantagem é de deixar para ultima hora e acabar não vendo a aula. Permitia preparar antes da aula. As gamificadas foram boas, obrigam o estudante a estar na sala de aulas para interagir com o docente. Atingi o nivel III. Não tive dificuldades, embora por vezes não tinha MB para navegar.	I was able to access all classes through the computer. Impression: Good, they allowed access to the class at any time, it made our lives easier. On the other hand, the disadvantage is to leave it for the last minute and end up not seeing the class. Allowed to prepare before class. The gamified ones were good, forcing the student to be in the classroom to interact with the teacher. I reached level III. I didn't have any difficulties, although sometimes I didn't have MB to browse.
Student 12	consegui aceder as aulas invertidas através do WhatsApp e usando o flash drive. Impressao: Os dois metodos são bons metodos, permite aprender mais, a qualquer hora aceder as aulas, a amificada permite mais prática permite ter contacto com o docente. Por	I was able to access the flipped classes through WhatsApp and using the flash drive. Imprint: Both methods are good methods, it allows you to learn more, access the classes at any time, the amified method allows more practice and allows you to have contact with the teacher. On the

	outro lado o estudante são prejudiciais, o estudante acaba deixando tudo para a ultima hora. Não tive a possibilidade de ver os trofeus porque usei o WhatsApp. Dificuldades: falta de Internet MB	other hand, the student is harmful, the student ends up leaving everything to the last minute. I didn't have the possibility to see the trophies because I used WhatsApp. Difficulties: lack of Internet MB
Student 13	Consegui, usei o computador, smartphone e flash drive. Impressao: foram de bastante apoio, não precisava de hora para aceder, em qualquer lugar e qualquer momento, sem estar na sala de aulas. As gamificadas foram de bastante apoio, mas as aulas invertidas foram melhores, mas nas gamificadas, se o docente falou um assunto acabamos esquecendo o que o docente falou. Consegui chegar sim ao nivel III, todos trofeus. Não tive difuldades. Dificuldades: É complexo usar dois métodos (invertido+gamificados), acabei o melhor era só focar no método de classes invertidas apenas e não misturar com gamificacao, é mais facil ver o video, em vez de tentar escrever o que o docente falou na sala de aulas.	Got it, used the computer, smartphone and flash drive. Impression: they were very supportive, I didn't need time to access, anywhere and anytime, without being in the classroom. The gamified ones were very supportive, but the flipped classes were better, but in the gamified ones, if the professor spoke a subject we ended up forgetting what the professor said. I managed to reach level III, all trophies. I had no difficulties. Difficulties: It is complex to use two methods (inverted+gamified), I ended up the best thing was just to focus on the method of inverted classes only and not mix it with gamification, it's easier to watch the video, instead of trying to write what the teacher said in the room of classes.
Recoder2REG 2 (4).m4a		
Student 14	Consegui, usei o computador. Via Smartphone. Impressao: Foi bom, facilita o aluno a fazer as actividades, submeter as actividades fisicamente tambem. Consegui chegar ao nivel III, não foi facil. 3 trofeus. Não tive dificuldades ao aceder.	Got it, I used the computer. Via Smartphone. Impression: It was good, it facilitates the student to do the activities, submitting the activities physically as well. I managed to get to level III, it wasn't easy. 3 trophies. I had no difficulties accessing it.
Student 15	Consegui aceder a todas actividades. Usei o telefone e computador. Impressao: gostei porque aprendi mais. 3 trofeus. Não tive dificuldades ao aceder.	I was able to access all activities. I used the phone and computer. Impression: I liked it because I learned more. 3 trophies. I had no difficulties accessing it.
Student 16	Consegui, usei o telefone, computador, usando Internet da Faculdade. Impressao: Achei muito bom , inovador, judou a aprender mais, com as video	I got it, I used the phone, computer, using the College's Internet. Impression: I found it very good, innovative, it helped to learn more, with the video lessons

	aulas e manuais, aprender mais sozinhos, porém o sistema estava lento, talvez porque usei o telefone. Consegui chegar ao nivel III, mas não pude mais, devido a pressao. 3 trofeus. Dificuldades: nos primeiros dias foi dificil, mas com a ajuda dos colegas acabei conseguindo.	and manuals, to learn more on my own, but the system was slow, maybe because I used the phone. I managed to get to level III, but I couldn't anymore, due to pressure. 3 trophies. Difficulties: in the first days it was difficult, but with the help of colleagues I managed to do it.
Recoder2REG 2 (5).m4a		
Student 17	sim consegui, usei computador e smartphone. Impressao: é um metodo eficaz, ajuda a estar mais perto do docente, e debater com o docente na sala de aulas. Encasa pude usufruir. Consegui todos os trofeus porque fiz todas actividades. Dificuldades: por vezes a plataforma ficava offline, mas como haviam aulas no WhatsApp acedia como alternativa. A plataforma tem que estar sempre disponivel.	Yes I did, I used computer and smartphone. Printing: it is an effective method, it helps to be closer to the teacher, and to debate with the teacher in the classroom. I was able to enjoy it. I got all the trophies because I did all the activities. Difficulties: sometimes the platform was offline, but as there were classes on WhatsApp, I accessed it as an alternative. The platform must always be available.
Student 18	Consegui aceder a todas aulas invertidas. usei computador e whatsapp como alternattiva. Impressao: gostei, o aluno aprende mais do que estando com o docente, o professor estava comigo encasa. aprendi muito. Consegui ganhar os 3 trofeus, fiz todas actividades. Por vezes a plataforma estava offline, sugeria que estivesse sempre online.	I was able to access all flipped classes. I used computer and WhatsApp as an alternative. Impression: I liked it, the student learns more than being with the teacher, the teacher was with me at home. Learned a lot. I managed to win the 3 trophies, I did all the activities. Sometimes the platform was offline, it suggested that it was always online.
Student 19	Consegui aceder a todas aulas invertidas. Usei o WhatsApp e Flash drive por falta de MB. Impressao: foram realizadas de boa forma, foi mais pratico. via computador encasa. Muito bom, tenho como ver o video, recuar, e na sala de aulas vou enquanto tenho bases do que estaou a tratar. Consegui chegar ao nivel II, 2 trofeus. Dificuldades: Conseguia ter os videos no proprio dia, encasa não conseguia. Mas mesmo assim. Sugestão é garantir a disponibilidad da plataforma.	I was able to access all flipped classes. I used WhatsApp and Flash drive for lack of MB. Impression: they were carried out in a good way, it was more practical. via computer home. Very good, I can watch the video, go back, and in the classroom I go while I have bases of what I was dealing with. I managed to get to level II, 2 trophies. Difficulties: I was able to have the videos on the same day, at home I couldn't. But anyway. Suggestion is to guarantee the availability of the platform.
Recoder2REG 2 (6).m4a		

Student 20	Sim consegui aceder atraves do computador e smartphone (WhatsApp). Impressao: Gamificacao não cheguei a testar so entrava na plataforma por causa dos videos. Classes invertidas foi razoavel, esteve a altura, consegui implementar a maioria dos desafios. Trofeus não seu quantos. Dificuldades: não conseguia submeter na plataforma por telefone, acabei usando o WhatsApp	Yes, I was able to access through the computer and smartphone (WhatsApp). Impression: gamification I didn't get to test it, I just entered the platform because of the videos. Inverted classes was reasonable, it was up to the task, I managed to implement most of the challenges. Trophies not yours how many. Difficulties: I couldn't submit on the platform by phone, I ended up using WhatsApp
Student 21	Não, não tinha laptop e so tinha telefone. Na plataforma não conseguia via telefone, tinha que vir a escola para receber o Videos. Submetia os resumos e questoes no WhatsApp. Acho que foi bom, desta vez o docente foi muito rigido e me senti lezado. Não consegui chegar ao nivel 3 na plataforma. Dificuldades: no telefone é dificil, fraca capacidade	No, I didn't have a laptop and I only had a phone. On the platform I couldn't via phone, I had to come to school to receive the Videos. Submit summaries and questions on WhatsApp. I think it was good, this time the teacher was very strict and I felt cheated. I couldn't get to level 3 on the platform. Difficulties: on the phone is difficult, poor ability
Student 22	Consegui aceder a todas, apesar das dificuldades. Eram faceis pois eram partilhadas no WhatsApp e na plataforma. Usei o computador 90% e algumas vezes no telemovel. Impressao: Docente estava um pouco puxado, aulas eram muito rápidas pois tinhamos que perceder em pouco tempo, mas a pressao foi boa. Consegui chegar ao nivel III, todos os 3 trofeus. Dificuldades: Computador tinha problemas, por vezes a plataforma estava offline.	I managed to access them all, despite the difficulties. They were easy as they were shared on WhatsApp and on the platform. I used the computer 90% and sometimes on the cell phone. Impression: Teacher was a little busy, classes were very fast because we had to understand in a short time, but the pressure was good. I managed to reach level III, all 3 trophies. Difficulties: Computer had problems, sometimes the platform was offline.
Student 23	Consegui aceder a todas, não tive dificuldades. usei tablet (Wifi de casa). Fazia as aulas encasa. Impressao: Foi facultativo, o estudante era o centro da atencao e não o docente. Consegui chegar ao nivel III, 3 trofeus. Dificuldades: Envio do resumo não dá o relatório de que o resumo foi enviado.	I was able to access them all, I had no difficulties. I used a tablet (Wifi from home). I took home classes. Impression: It was optional, the student was the center of attention and not the teacher. I managed to reach level III, 3 trophies. Difficulties: Submission of the abstract does not give the report that the abstract was submitted.
Recoder2REG 2 (7).3gpp		

Student 24	Consegui aceder a todas as aulas, usando,WhatsApp e Plataforma, primeiro fazia no caderno. Impressao: muito boa porque já conheco, em caso de duvidas era so rever os conceitos melhorando o estudo independente. Contava com ajuda dos colegas e docentes para sanar as duvidas. Não recordo do numero dos trofeus, mas consegui chegar ao nivel 3. DIficuldade: Senha, não conseguia recuperar, mas depois consegui uma nova senha.	I was able to access all classes, using WhatsApp and Platform, first I did it in the notebook. Impression: very good because I already know it, in case of doubts, I just had to review the concepts, improving the independent study. He counted on the help of colleagues and teachers to solve the doubts. I don't remember the number of trophies, but I managed to get to level 3. Difficulty: Password, I couldn't recover, but then I got a new password.
Student 25	Consegui aceder, atraves de WhatsApp e Computador. Impressao: Foi muito bom, diferente, possivel haver interacao com o que o docente estava a leccionar, apesar de ter havido pouca aceitacao dos colegas, consegui o terceiro nivel e 3 trofeus.	I managed to access it through WhatsApp and Computer. Impression: It was very good, different, possible interaction with what the teacher was teaching, despite having little acceptance from colleagues, I got the third level and 3 trophies.
Student 26	Consegui aceder todas aulas usando comoutador e WhatsApp, foi uma bordagem importante, interativo, divertido. Consegui chegar ao nivel 3 e trifeus. Dificuldades: falta de tempo	I was able to access all classes using the commutator and WhatsApp, it was an important, interactive, fun approach. I managed to get to level 3 and triphies. Difficulties: lack of time
Student 27	Foi uma experiencia muito boa, motivatdora, em comparacao com o metodo tradicional este é melhor, incentiva o estudante a praticar. Usei computador e WhatsApp. Consegui fazer todos desafios e trofeus. Dificuldades:	It was a very good, motivating experience, compared to the traditional method, this one is better, it encourages the student to practice. I used computer and WhatsApp. I managed to do all the challenges and trophies. Difficulties:
Student 28	Consegui aceder usando laptop, foram boas, positivas. Mais tempo para investigar, consegui chgar ao nivel 3 e trofeus. Dificuldades: erros de compilacao dos programas	I was able to access using a laptop, they were good, positive. More time to investigate, I managed to reach level 3 and trophies. Difficulties: program compilation errors
Student 29	Consegui, atraves do WhatsApp e computador. Foram divertidas, boa experiencia. Realizei todos trabalho e trofeus. primeiros dias tive dificuldades em aceder o sistema.	I got it, through WhatsApp and computer. It was fun, good experience. I did all the work and trophies. first few days I had difficulties in accessing the system.
RecordPL(2).mp4		

Student 30	Consegui sim, usando telefone e computador. Impressao: Foi com, adequado ao ramo da Informática. Consegui chegar ao nivel III. Dif: Não tinha MB para navegar.	Yes I did, using phone and computer. Impression: It was with, suitable for the field of Informatics. I managed to get to level III. Diff: Didn't have MB to browse.
Student 31	Consegui. Usei o computador. É um bom metodo, podeia realizar actividades enquanto estava a trabalhar. Não consegui chegar ao nivel III, tive apenas um trofeu. Dif: Falha na Internet.	I achieved. I used the computer. It is a good method, I could carry out activities while I was working. I couldn't reach level III, I only had one trophy. Diff: Internet failure.
Student 32	Consegui aceder a todas aulas, usei computador, flash e WhatsApp. É uma boa iniciativa, faculta o estudante no ensino e aprendizagem porque em qualquer canto e altura pode estudar, não consegui chegar ao nivel III, so consegui 2 trofeus. Dif: Rede oscilava, tinha sinal fraco.	I was able to access all classes, I used computer, flash and WhatsApp. It's a good initiative, it allows the student to teach and learn because he can study anywhere and anytime, I couldn't reach level III, I only got 2 trophies. Dif: Network was oscillating, had a weak signal.
RecordPL(3).mpeg		
Student 33	Consegui aceder atraves do computador, tive uma boa impressao, facilitava ao estudante pois por vezes não temos tempo de participar na aula, consegui chegar ao nivel III. Dif: Por vezes o sisstema estava indisponivel	I managed to access it through the computer, I had a good impression, it made it easier for the student because sometimes we don't have time to participate in the class, I managed to reach level III. Diff: Sometimes the system was unavailable
Student 34	Consegui aceder, apartir do meu computador. Achei uma experiencia muito boa, já tinha passado por ela no semestre anterior. Adiquiri 3 trofeus e consegui chegar ao nivel III. Não tive qualquer dificuldade.	I managed to access it from my computer. I thought it was a very good experience, I had already gone through it in the previous semester. I acquired 3 trophies and managed to reach level III. I didn't have any difficulties.
Student 35	Achei muiti interessante (aulas invertidas), foi um conceito inusitado, deu-me um certo impulso, as video aulas ajudaram no meu aprendizado. Dif:tive algumas mas com as video aulas consegui ultrapassar. Por vezes a plataforma caia. Consegui aceder a todos os desafio. Gostei da ideia, espero que nos proximo anos tenhamos mais.	I found it very interesting (inverted classes), it was an unusual concept, it gave me a certain impulse, the video classes helped me to learn. Dif: I had some but with the video classes I managed to overcome. Sometimes the platform falls. I managed to access all the challenges. I liked the idea, I hope that in the coming years we will have more.
Student 36	Consegui aceder todas aulas invertidas apartir do computador e smartphone. Tive boa	I was able to access all inverted classes from the computer and smartphone. I had a good

	impressao, ajudou aos demais, aos que não tinham chance de vir a aula, podiam aceder a plataforma e ter a aula lá. Consegui chegar ao nivel III e todos os trofeus. Não tive nenhuma dificuldade	impression, it helped others, those who didn't have the chance to come to the class, could access the platform and have the class there. I managed to reach level III and all the trophies. I didn't have any difficulties
RecordPL (4).ogg		
Student 37	Consegui aceder a todas aulas atraves do WhatsApp e computador. Acho bom, inovador, maior interacao entre estudantes, estava motivado. Consegui chegar ao nivel III e adquirir todos trofeus. Dif: Internet não estava boa	I was able to access all classes through WhatsApp and computer. I think it's good, innovative, greater interaction between students, I was motivated. I managed to reach level III and acquire all trophies. Diff: Internet was not good
Student 38	Consegui aceder a todas aulas inv, usando comoputador e smartphone. Foi boa, positiva, podemos estar em constante interaccao com este metodo. Consegui chegar ao nivel III e adquirir os trofeus. Dif: acesso a plataforma por vezes estava baixo e tambem o sinal da internet que era fraco.	I was able to access all inv classes using my computer and smartphone. It was good, positive, we can be in constant interaction with this method. I managed to reach level III and acquire the trophies. Diff: access to the platform was sometimes low and also the internet signal was weak.
Student 39	Usava computador e WhatsApp, é inovador, deu para aprender mais sobre o metodo. Consegui chegar ao nivel III e trofeus. Dif: Por causa da Internet por vezes não conseguia aceder a plataforma. Falta de informacao de novos trabalhos e videos na plataforma.	I used a computer and WhatsApp, it's innovative, I could learn more about the method. I managed to reach level III and trophies. Dif: Because of the Internet, sometimes I couldn't access the platform. Lack of information about new works and videos on the platform.
Student 40	Consegui aceder a todas aulas invertidas, usei computador e por vezes o WhatsApp. Impressao: Gostei muito, o aluno tem opurtunidade de recuar a video aula, mesmo sendo lento em entender a materia podia recuar. Consegui chegar ao nivel III mas não consegui o desafio final. Dif: Tempo que tinhamos era muito apertado tendo em conta as outras cadeiras.	I was able to access all inverted classes, I used the computer and sometimes WhatsApp. Impression: I liked it a lot, the student has the opportunity to go back to the video lesson, even if he is slow to understand the material, he could go back. I managed to get to level III but I didn't get the final challenge. Dif: The time we had was very tight considering the other chairs.
RecordPL(5).amr		
Student 41	Consegui aceder co recurso ao computador e telefone. Impressao: foi bom. Consegui os 3 trofeus. Não tive qualquer	I was able to access using the computer and telephone. Impression: it was good. I got all 3 trophies. I didn't have any

	dificuldade. É de louvar, ajudou muito, tinha dificuldades em criar arrays, criar objectos…só viamos video-aulas dos outros, sendo nosso professor é muito bom, percebemos melhor (fala nossa lingua).	difficulties. It is to be commended, it helped a lot, I had difficulties in creating arrays, creating objects… we only watched video lessons from others, being our teacher is very good, we understand better (speaks our language).
Student 42	Usei o computador e telefone, é de louvar, foi bom. Consegui os 3 trofeus e nivel III.	I used the computer and phone, it is to be commended, it was good. Got all 3 trophies and level III.
Student 43	Usando o computador e telefone. Impressao: nota mill, ajuda onde estiver. Consegui 3 trofeus. Não tive muitas dificuldades. O método deve continuar.	Using computer and phone. Print: note mill, help wherever you are. I got 3 trophies. I didn't have many difficulties. The method must continue.
RecordPL(8).mp4		
Student 44	Sim consegui aceder a todas aulas, atraves do computador. Consegui chegar ao nivel III.	Yes, I was able to access all classes through the computer. I managed to get to level III.
Student 45	Sim consegui aceder a todas aulas, atraves do computador, achei interessante, o professor dava topicos nos videos, era mais facil me guiar para pesquisar e resolver execicios e trabalhos. Consegui chegar ao nivel III. 4 trofeus	Yes, I was able to access all classes, through the computer, I found it interesting, the teacher gave topics in the videos, it was easier to guide me to research and solve exercises and assignments. I managed to get to level III. 4 trophies
Student 46	Sim consegui aceder a todas aulas, atraves do smartphone, foi interessante, foi uma oportunidade de aprender mais com o metodo, mais conhecimento sobre as aulas invertidas. Como usei WhatsApp não pude aceder a plataforma para ter os trofeus. Dif: falta de computador	Yes, I was able to access all classes, through the smartphone, it was interesting, it was an opportunity to learn more with the method, more knowledge about the flipped classes. As I used WhatsApp I could not access the platform to get the trophies. Diff: lack of computer
Student 47	Sim consegui aceder a todas aulas, atraves do computador, me senti avontade, tive chance de investigar e estudar sozinho, acredito que é mais facil ser mais produtivo estudante sozinho. Consegui chegar ao nivel III. 4 trofeus.	Yes, I was able to access all classes, through the computer, I felt comfortable, I had the chance to investigate and study alone, I believe it is easier to be a more productive student alone. I managed to get to level III. 4 trophies.
Student 48	Sim consegui aceder a todas aulas, atraves do computador, Pra mim foi interessante, gostei, me senti a vontade, sem pressao. Consegui chegar ao nivel III. 4 trofeus	Yes, I was able to access all classes, through the computer. For me it was interesting, I liked it, I felt comfortable, without pressure. I managed to get to level III. 4 trophies
Dificuldades:		Difficulties:

Dificuldade em passar de nível pois para chegar ao proximo tinha que passar pelo anterior. MB de Internet não foi facil. Acesso a Internet, é dificil baixar os Videos sem Internet publica/free, sai caro		Difficulty in passing the level because to get to the next one had to go through the previous one. MB of Internet was not easy. Internet access, it is difficult to download the Videos without public/free Internet, it is expensive
RecordPL (9).ogg		
Student 49 Student 50 Student 51	Conseguimos aceder a todas aulas invertidas, via WhatsApp e computador. Impressao: é muito bom, estando ou não na aula, tens explicacao do docente na plataforma e no whatsApp. Expondo as questoes e o docente responde, duvidas e sugestoes…há uma interaccao docente-estudante. Conseguimos chegar ao nivel III. Dif: Por vezes a plataforma estava offline e Internet não estava boa.	We were able to access all inverted classes, via WhatsApp and computer. Impression: it is very good, whether or not you are in class, you have an explanation from the teacher on the platform and on WhatsApp. Exposing the questions and the teacher answers, doubts and suggestions…there is a teacher-student interaction. We managed to reach level III. Diff: Sometimes the platform was offline and the Internet was not good.
RecordPL(10).mp4		
Student 52	Consegui sim aceder a todas aulas, dei finalidade a resolucao de todos exercicios que lá existiam. Foram puxadas, ficamos apertados, foram pesadas, mas deu pra fazer. Metodo bom, mas por ser a primeira vez foi complicado, mas depois o estudante acaba se habituando. Consegui chegar ao nivell III, e todos os trofeus. Não tive dificuldades em aceder conteudos	Yes, I managed to access all classes, I gave purpose to solving all the exercises that existed there. They were pulled, we were tight, they were heavy, but it was manageable. Good method, but for being the first time it was complicated, but later the student ends up getting used to it. I managed to reach level III, and all the trophies. I had no difficulties accessing content
Student 53	Sim consegui aceder a todas aulas, foram bons, mas o metodo foi complicado devido a dificuldades no acesso a plataforma. Acho metodo Interessante, ajuda o estudane a lidar com as tecnologias. Consegui chegar ao nivell III, e todos os trofeus Dif: Falha da conexao, a plataforma oscilava.	Yes, I managed to access all classes, they were good, but the method was complicated due to difficulties in accessing the platform. I find the method Interesting, it helps the student to deal with technologies. I managed to reach level III, and all the trophies Diff: Connection failed, platform wobbled.
Student 54	Consegui aceder a todas aulas invertidas, embora no inicio tenha sido complicado tive dificuldades para aceder a plataforma mas passado um	I was able to access all inverted classes, although at first it was complicated I had difficulties accessing the platform but after a while I was able to publish the

	tempo pude publicar os trabalhos acumulados na plataforma. Foram bem realizadas apesar das dificuldades. Foi uma boa experi6encia, foi dificil, por vezes é bom trabalhar sob pressao, nas proximas vezes poderemos ter resultados melhores. Consegui chegar ao nivel III no fim, todos trofeus. Dificuldades: Não conseguia aceder a plataforma.	work accumulated on the platform. They were well done despite the difficulties. It was a good experience, it was difficult, sometimes it's good to work under pressure, next time we can have better results. I managed to reach level III at the end, all trophies. Difficulties: Could not access the platform.
Student 55	Sim consegui, as aulas foram realizadas nas melhores formas possiveis. Foi interessante, mostrou que astecnologias vieram para ajudar a facilitacao das aulas, gostaria que fosse implementado nos proximos anos. Consegui chegar ao nivell III, e todos os trofeus. Dif: Falha da conexao, a plataforma oscilava	Yes I did, the classes were held in the best possible ways. It was interesting, it showed that the technologies came to help facilitate the classes, I would like it to be implemented in the coming years. I managed to reach level III, and all the trophies. Diff: Connection failure, platform oscillated

Appendix 7. Computer Farm photo

Appendix 8. Computer science class in a collaborative activity

Appendix 9. Computer science class final marksheet of Lab III (Java) 2019

9.1 Night shift

2ª via

UNIVERSIDADE PEDAGÓGICA
MOÇAMBIQUE

UP SEDE
Escola Superior Técnica
Departamento de Informática
Curso de Licenciatura em Informática

Disciplina: **Laboratório de Informática III (Java)**
Plano: **PLANO B**
Ano Lectivo: **2019** Semestre: **2** Ano: **2** Turma: **1** Créditos: ___ Regime: **Pós-Laboral**
Docente: **CÉLIO BARBOSA SENGO**

* M.HC: Média da avaliação das Horas de Contacto = 50% M.HEI: Média da avaliação das Horas de Estudo Independente = 50% M.F: Média de Frequência = 75%

			*NOTAS DE FREQUÊNCIA				EXAME		Nota	Resultado
N.º	Nº Estudante	Nome do Estudante	M.HC	M.HEI	M.F	Resultado	Nor	Rec	Final	Final
1	01-1756-2018	ADELAIDE BARTOLOMEU LANGA	0	0	0	Reprovado				Reprovado
2	[redacted]		12	11	12	Aprovado			12	Aprovado
3			10	12	11	Aprovado			11	Aprovado
4			0	0	0	Reprovado				Reprovado
5			0	0	0	Reprovado				Reprovado
6			9	14	12	Aprovado			12	Aprovado
7			0	0	0	Reprovado				Reprovado
8			9	10	10	Aprovado			10	Aprovado
9			5	9	7	Reprovado				Reprovado
10			15	16	16	Aprovado			16	Aprovado
11			0	0	0	Reprovado				Reprovado
12			0	0	0	Reprovado				Reprovado
13			0	0	0	Reprovado				Reprovado
14			0	0	0	Reprovado				Reprovado
15			0	0	0	Reprovado				Reprovado
16			0	0	0	Reprovado				Reprovado
17			14	13	14	Aprovado			14	Aprovado
18			0	0	0	Reprovado				Reprovado
19			9	10	10	Aprovado			10	Aprovado
20			0	0	0	Reprovado				Reprovado
21			0	0	0	Reprovado				Reprovado
22			0	0	0	Reprovado				Reprovado
23			0	0	0	Reprovado				Reprovado
24			0	0	0	Reprovado				Reprovado
25			0	0	0	Reprovado				Reprovado
26			0	0	0	Reprovado				Reprovado
27			0	0	0	Reprovado				Reprovado
28			0	0	0	Reprovado				Reprovado
29			0	0	0	Reprovado				Reprovado
30			0	0	0	Reprovado				Reprovado
31			13	16	15	Aprovado			15	Aprovado
32			8	10	9	Reprovado				Reprovado
33			12	12	12	Aprovado			12	Aprovado

Documento processado por computador

23/01/2023

34		0	0	0	Reprovado				Reprovado
35		15	14	15	Aprovado			15	Aprovado
36		11	14	13	Aprovado			13	Aprovado
37		0	0	0	Reprovado				Reprovado
38		0	0	0	Reprovado				Reprovado
39		13	14	14	Aprovado			14	Aprovado
40		0	0	0	Reprovado				Reprovado
41		0	0	0	Reprovado				Reprovado

Documento processado por computador

23/01/2023

Assinaturas:

Docente 23/01/23

Chefe do Departamento 23/01/2023

Director da Faculdade __/__/____

Matricula Inicial			Anularam Matricula			Avaliados			Excluidos			Reprovados			Aprovados		
H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M
28	13	41	0	0	0	11	3	14	0	0	0	1	1	2	10	2	12

9.2 Day shift

2ª via

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			*NOTAS DE FREQUÊNCIA				EXAME		Nota	Resultado
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1			2	9	6	Reprovado				Reprovado
2			8	11	10	Aprovado			10	Aprovado
3			9	10	10	Aprovado			10	Aprovado
4			7	10	9	Reprovado				Reprovado
5			13	12	13	Aprovado			13	Aprovado
6			9	10	10	Aprovado			10	Aprovado
7			13	12	13	Aprovado			13	Aprovado
8			12	14	13	Aprovado			13	Aprovado
9			8	9	9	Reprovado				Reprovado
10			8	11	10	Aprovado			10	Aprovado
11			9	10	10	Aprovado			10	Aprovado
12			5	10	8	Reprovado				Reprovado
13			0	0	0	Reprovado				Reprovado
14			9	12	11	Aprovado			11	Aprovado
15			2	9	6	Reprovado				Reprovado
16			5	9	7	Reprovado				Reprovado
17			0	0	0	Reprovado				Reprovado
18			12	13	13	Aprovado			13	Aprovado
19			0	0	0	Reprovado				Reprovado
20			9	10	10	Aprovado			10	Aprovado
21			8	10	9	Reprovado				Reprovado
22			7	12	10	Aprovado			10	Aprovado
23			12	12	12	Aprovado			12	Aprovado
24			0	0	0	Reprovado				Reprovado
25			7	10	9	Reprovado				Reprovado
26			8	16	12	Aprovado			12	Aprovado
27			8	12	10	Aprovado			10	Aprovado
28			9	11	10	Aprovado			10	Aprovado
29			9	12	11	Aprovado			11	Aprovado
30			9	14	12	Aprovado			12	Aprovado
31			0	0	0	Reprovado				Reprovado
32			8	14	11	Aprovado			11	Aprovado
33			9	14	12	Aprovado			12	Aprovado

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23/01/2023

34		8	11	10	Aprovado			10	Aprovado
35		8	12	10	Aprovado			10	Aprovado
36		7	10	9	Reprovado				Reprovado
37		0	0	0	Reprovado				Reprovado
38		0	0	0	Reprovado				Reprovado
39		8	11	10	Aprovado			10	Aprovado
40		8	11	10	Aprovado			10	Aprovado
41		0	0	0	Reprovado				Reprovado
42		8	12	10	Aprovado			10	Aprovado
43		10	14	12	Aprovado			12	Aprovado
44		9	12	11	Aprovado			11	Aprovado
45		9	10	10	Aprovado			10	Aprovado
46		8	10	9	Reprovado				Reprovado
47		0	0	0	Reprovado				Reprovado
48		1	9	5	Reprovado				Reprovado

Assinaturas:

Docente 23/01/23 Chefe do Departamento 30/1/2023 Director da Faculdade __/__/____

Matricula Inicial			Anularam Matricula			Avaliados			Excluídos			Reprovados			Aprovados		
H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M	H	M	H/M
27	21	48	0	0	0	18	21	39	0	0	0	4	7	11	14	14	28

Appendix 10. Motivation ANOVA results

10.1. Interest/Enjoyment subscale

```
GET
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experiment - FINAL\MotivationFINAL.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
GLM Interest_enjoy1.Traditional Interest_enjoy2.GFC Interest_enjoy.3Traditional BY Shift
  /WSFACTOR=Time 3 Polynomial
  /METHOD=SSTYPE(3)
 /PLOT=PROFILE(Time*Shift)
  /EMMEANS=TABLES(Time*Shift) COMPARE (Time)
  /EMMEANS=TABLES(Time*Shift) COMPARE (Shift)
  /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Time
  /DESIGN=Shift.
```

Within-Subjects Factors

Measure: MEASURE_1

Time	Dependent Variable
1	Interest_enjoy1.Traditional
2	Interest_enjoy2.GFC
3	Interest_enjoy.3Traditional

Between-Subjects Factors

		Value Label	N
Day or Night	1.0	Day	29
	2.0	Night	17

Descriptive Statistics

	Day or Night	Mean	Std. Deviation	N
Interest_enjoy1.Traditional	Day	5.2995	.80832	29
	Night	4.8501	.96281	17
	Total	5.1334	.88558	46
Interest_enjoy2.GFC	Day	5.6281	1.07064	29
	Night	5.2801	1.04150	17
	Total	5.4995	1.06196	46
Interest_enjoy.3Traditional	Day	5.7611	.87779	29
	Night	4.9692	.70855	17
	Total	5.4684	.89849	46

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.979	.894	2	.640	.980	1.000	.500

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	3.373	2	1.687	2.433	.094	.052
	Greenhouse-Geisser	3.373	1.960	1.721	2.433	.095	.052
	Huynh-Feldt	3.373	2.000	1.687	2.433	.094	.052
	Lower-bound	3.373	1.000	3.373	2.433	.126	.052
Time * Shift	Sphericity Assumed	1.160	2	.580	.837	.437	.019
	Greenhouse-Geisser	1.160	1.960	.592	.837	.434	.019
	Huynh-Feldt	1.160	2.000	.580	.837	.437	.019
	Lower-bound	1.160	1.000	1.160	.837	.365	.019
Error(Time)	Sphericity Assumed	60.989	88	.693			
	Greenhouse-Geisser	60.989	86.227	.707			
	Huynh-Feldt	60.989	88.000	.693			
	Lower-bound	60.989	44.000	1.386			

Estimated Marginal Means

Estimates

Measure: MEASURE_1

Time	Day or Night	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	Day	5.300	.161	4.975	5.624
	Night	4.850	.210	4.426	5.274
2	Day	5.628	.197	5.231	6.025
	Night	5.280	.257	4.762	5.798
3	Day	5.761	.152	5.454	6.068
	Night	4.969	.199	4.568	5.370

Pairwise Comparisons

Measure: MEASURE_1

Day or Night	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Day	1	2	-.329	.234	.167	-.799	.142
		3	-.462*	.209	.032	-.882	-.041
	2	1	.329	.234	.167	-.142	.799
		3	-.133	.213	.535	-.562	.296
	3	1	.462*	.209	.032	.041	.882
		2	.133	.213	.535	-.296	.562
Night	1	2	-.430	.305	.166	-1.045	.185
		3	-.119	.273	.664	-.668	.430
	2	1	.430	.305	.166	-.185	1.045
		3	.311	.278	.269	-.249	.871
	3	1	.119	.273	.664	-.430	.668
		2	-.311	.278	.269	-.871	.249

Pairwise Comparisons

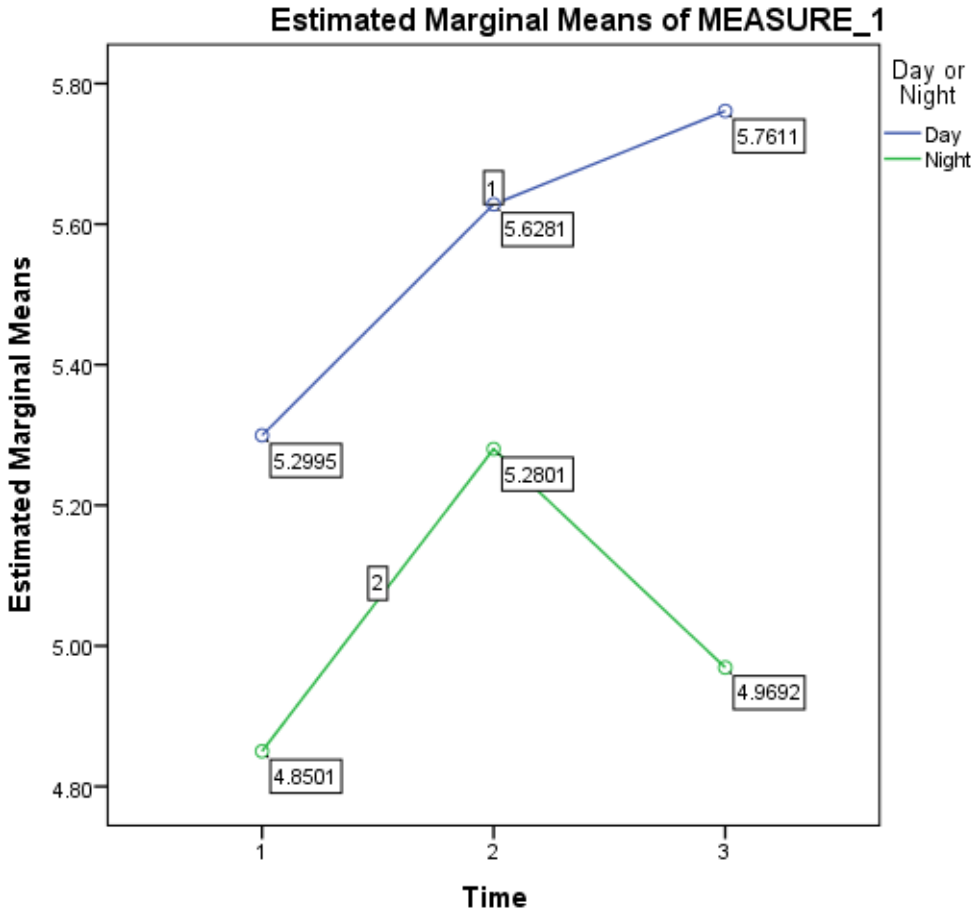
Measure: MEASURE_1

Time	(I) Day or Night	(J) Day or Night	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
1	Day	Night	.449	.265	.097	-.085	.984
	Night	Day	-.449	.265	.097	-.984	.085
2	Day	Night	.348	.324	.288	-.305	1.001
	Night	Day	-.348	.324	.288	-1.001	.305
3	Day	Night	.792*	.251	.003	.287	1.297
	Night	Day	-.792*	.251	.003	-1.297	-.287

Univariate Tests

Measure: MEASURE_1

Time		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
1	Contrast	2.164	1	2.164	2.875	.097	.061
	Error	33.127	44	.753			
2	Contrast	1.298	1	1.298	1.155	.288	.026
	Error	49.451	44	1.124			
3	Contrast	6.721	1	6.721	9.988	.003	.185
	Error	29.607	44	.673			



10.2 Perceived competence subscale

```
GLM Perceived_Competence.1.Traditional Perceived_Competence.2.GFC
Perceived_Competence.3.Traditional BY Shift
  /WSFACTOR=Time 3 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(Time*Shift)
  /EMMEANS=TABLES(Shift) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(Time) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(Shift*Time)
  /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Time
  /DESIGN=Shift.
```

Within-Subjects Factors

Measure: MEASURE_1

Time	Dependent Variable
1	Perceived_Competence.1.Traditional
2	Perceived_Competence.2.GFC
3	Perceived_Competence.3.Traditional

Between-Subjects Factors

		Value Label	N
Day or Night	1.0	Day	29
	2.0	Night	17

Descriptive Statistics

	Day or Night	Mean	Std. Deviation	N
Perceived_Competence.1.Traditional	Day	4.1500	1.01665	29
	Night	3.4824	1.33428	17
	Total	3.9033	1.17570	46
Perceived_Competence.2.GFC	Day	4.6207	1.25624	29
	Night	3.8824	1.41608	17
	Total	4.3478	1.35084	46
Perceived_Competence.3.Traditional	Day	4.3569	1.02380	29
	Night	4.0618	.86522	17
	Total	4.2478	.96907	46

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time	Pillai's Trace	.091	2.148[b]	2.000	43.000	.129	.091
	Wilks' Lambda	.909	2.148[b]	2.000	43.000	.129	.091
	Hotelling's Trace	.100	2.148[b]	2.000	43.000	.129	.091
	Roy's Largest Root	.100	2.148[b]	2.000	43.000	.129	.091
Time * Shift	Pillai's Trace	.020	.439[b]	2.000	43.000	.648	.020
	Wilks' Lambda	.980	.439[b]	2.000	43.000	.648	.020
	Hotelling's Trace	.020	.439[b]	2.000	43.000	.648	.020
	Roy's Largest Root	.020	.439[b]	2.000	43.000	.648	.020

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.965	1.515	2	.469	.967	1.000	.500

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	4.943	2	2.471	1.860	.162	.041
	Greenhouse-Geisser	4.943	1.933	2.557	1.860	.163	.041
	Huynh-Feldt	4.943	2.000	2.471	1.860	.162	.041
	Lower-bound	4.943	1.000	4.943	1.860	.180	.041
Time * Shift	Sphericity Assumed	1.215	2	.608	.457	.634	.010
	Greenhouse-Geisser	1.215	1.933	.629	.457	.628	.010
	Huynh-Feldt	1.215	2.000	.608	.457	.634	.010
	Lower-bound	1.215	1.000	1.215	.457	.502	.010
Error(Time)	Sphericity Assumed	116.892	88	1.328			
	Greenhouse-Geisser	116.892	85.055	1.374			
	Huynh-Feldt	116.892	88.000	1.328			
	Lower-bound	116.892	44.000	2.657			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2153.844	1	2153.844	1630.264	.000	.974
Shift	10.338	1	10.338	7.825	.008	.151
Error	58.131	44	1.321			

Estimated Marginal Means (Day or Night)

Estimates

Measure: MEASURE_1

Day or Night	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Day	4.376	.123	4.128	4.624
Night	3.809	.161	3.484	4.133

Pairwise Comparisons

Measure: MEASURE_1

(I) Day or Night	(J) Day or Night	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Day	Night	.567*	.203	.008	.159	.976
Night	Day	-.567*	.203	.008	-.976	-.159

Univariate Tests

Measure: MEASURE_1

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	3.446	1	3.446	7.825	.008	.151
Error	19.377	44	.440			

2. Time

Pairwise Comparisons

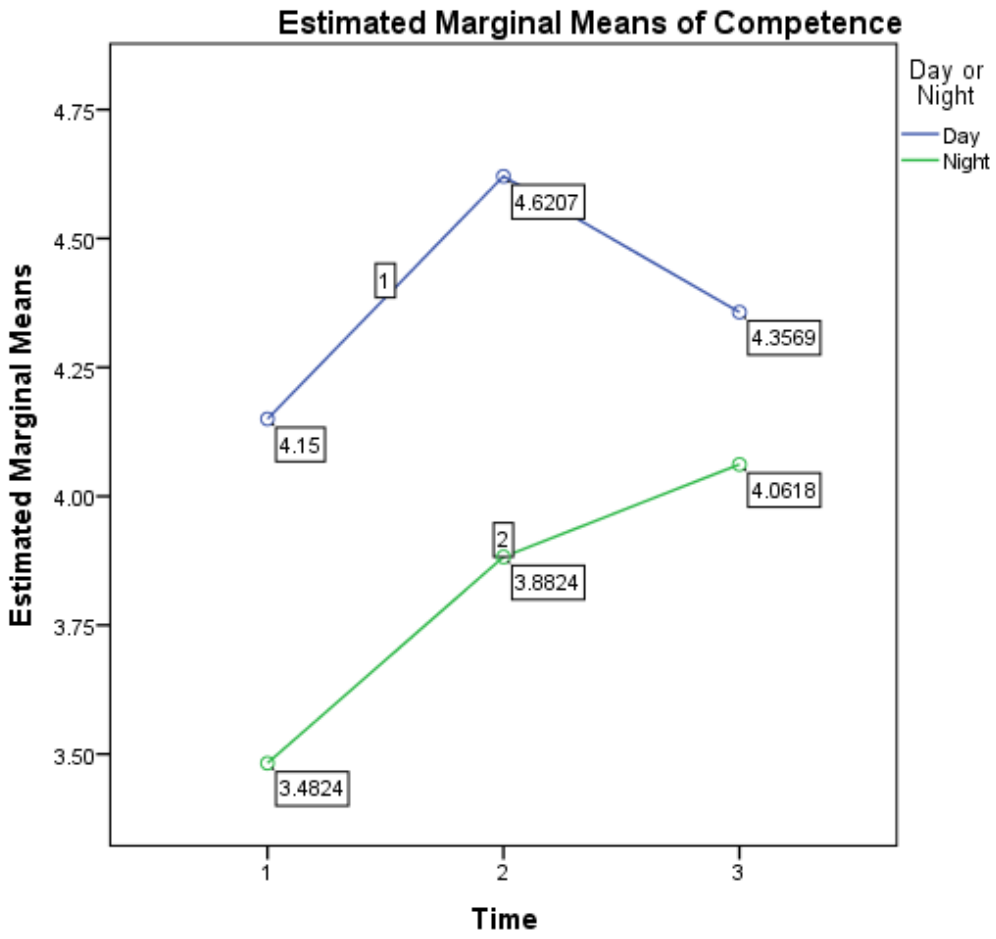
Measure: MEASURE_1

(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.435	.249	.088	-.938	.067
	3	-.393	.228	.091	-.852	.066
2	1	.435	.249	.088	-.067	.938
	3	.042	.268	.876	-.498	.583
3	1	.393	.228	.091	-.066	.852
	2	-.042	.268	.876	-.583	.498

3. Day or Night * Time

Measure: MEASURE_1

Day or Night	Time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Day	1	4.150	.212	3.722	4.578
	2	4.621	.244	4.128	5.113
	3	4.357	.180	3.994	4.720
Night	1	3.482	.277	2.924	4.041
	2	3.882	.319	3.239	4.526
	3	4.062	.235	3.588	4.535



10.3. Pressure/tension subscale

```
GLM Pressure_Tension.2.GFC Pressure_Tension.3.Traditional BY Shift
  /WSFACTOR=Time 2 Polynomial
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(Time*Shift)
  /EMMEANS=TABLES(Time*Shift) COMPARE (Time)
  /EMMEANS=TABLES(Time*Shift) COMPARE (Shift)
  /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Time
  /DESIGN=Shift.
```

Within-Subjects Factors

Measure: MEASURE_1

Time	Dependent Variable
1	Pressure_Tension.2.GFC
2	Pressure_Tension.3.Traditional

Between-Subjects Factors

		Value Label	N
Day or Night	1.0	Day	29
	2.0	Night	17

Descriptive Statistics

	Day or Night	Mean	Std. Deviation	N
Pressure_Tension.2.GFC	Day	3.6839	1.21934	29
	Night	3.5637	1.57413	17
	Total	3.6395	1.34521	46
Pressure_Tension.3.Traditional	Day	3.7471	1.23432	29
	Night	4.1618	1.01912	17
	Total	3.9004	1.16543	46

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time	Pillai's Trace	.045	2.066[b]	1.000	44.000	.158	.045
	Wilks' Lambda	.955	2.066[b]	1.000	44.000	.158	.045
	Hotelling's Trace	.047	2.066[b]	1.000	44.000	.158	.045
	Roy's Largest Root	.047	2.066[b]	1.000	44.000	.158	.045
Time * Shift	Pillai's Trace	.030	1.352[b]	1.000	44.000	.251	.030
	Wilks' Lambda	.970	1.352[b]	1.000	44.000	.251	.030
	Hotelling's Trace	.031	1.352[b]	1.000	44.000	.251	.030
	Roy's Largest Root	.031	1.352[b]	1.000	44.000	.251	.030

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	1.000	.000	0	.	1.000	1.000	1.000

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	2.343	1	2.343	2.066	.158	.045
	Greenhouse-Geisser	2.343	1.000	2.343	2.066	.158	.045
	Huynh-Feldt	2.343	1.000	2.343	2.066	.158	.045
	Lower-bound	2.343	1.000	2.343	2.066	.158	.045
Time * Shift	Sphericity Assumed	1.533	1	1.533	1.352	.251	.030
	Greenhouse-Geisser	1.533	1.000	1.533	1.352	.251	.030
	Huynh-Feldt	1.533	1.000	1.533	1.352	.251	.030
	Lower-bound	1.533	1.000	1.533	1.352	.251	.030
Error(Time)	Sphericity Assumed	49.895	44	1.134			
	Greenhouse-Geisser	49.895	44.000	1.134			
	Huynh-Feldt	49.895	44.000	1.134			
	Lower-bound	49.895	44.000	1.134			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1231.001	1	1231.001	597.451	.000	.931
Shift	.465	1	.465	.225	.637	.005
Error	90.659	44	2.060			

Estimated Marginal Means (Time * Day or Night)

Estimates

Measure: MEASURE_1

Time	Day or Night	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	Day	3.684	.252	3.175	4.193
	Night	3.564	.330	2.899	4.228
2	Day	3.747	.216	3.313	4.182
	Night	4.162	.282	3.594	4.729

Pairwise Comparisons

Measure: MEASURE_1

Day or Night	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Day	1	2	-.063	.280	.822	-.627	.500
	2	1	.063	.280	.822	-.500	.627
Night	1	2	-.598	.365	.109	-1.334	.138
	2	1	.598	.365	.109	-.138	1.334

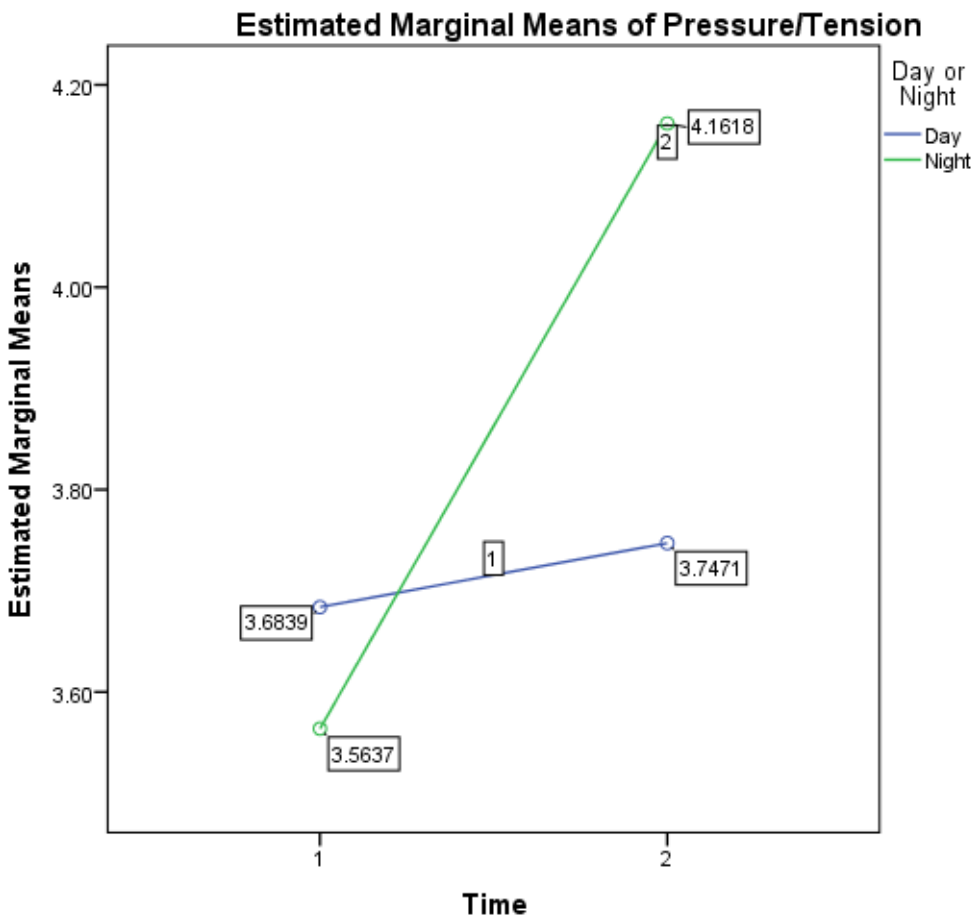
Multivariate Tests

Day or Night		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Day	Pillai's trace	.001	.051[a]	1.000	44.000	.822	.001
	Wilks' lambda	.999	.051[a]	1.000	44.000	.822	.001
	Hotelling's trace	.001	.051[a]	1.000	44.000	.822	.001
	Roy's largest root	.001	.051[a]	1.000	44.000	.822	.001
Night	Pillai's trace	.057	2.681[a]	1.000	44.000	.109	.057
	Wilks' lambda	.943	2.681[a]	1.000	44.000	.109	.057
	Hotelling's trace	.061	2.681[a]	1.000	44.000	.109	.057
	Roy's largest root	.061	2.681[a]	1.000	44.000	.109	.057

Pairwise Comparisons

Measure: MEASURE_1

Time	(I) Day or Night	(J) Day or Night	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1	Day	Night	.120	.415	.774	-.717	.957
	Night	Day	-.120	.415	.774	-.957	.717
2	Day	Night	-.415	.355	.249	-1.129	.300
	Night	Day	.415	.355	.249	-.300	1.129



10.4 Perceived choice subscale

```
GLM Perceived_Choice.1.Traditional Perceived_Choice.2.GFC Perceived_Choice.3.Traditional BY
Shift
  /WSFACTOR=TimeChoice 3 Polynomial
  /METHOD=SSTYPE(3)
  /POSTHOC=Shift(TUKEY LSD)
  /PLOT=PROFILE(TimeChoice*Shift)
 /EMMEANS=TABLES(TimeChoice*Shift) COMPARE (TimeChoice)
  /EMMEANS=TABLES(TimeChoice*Shift) COMPARE (Shift)
  /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=TimeChoice
  /DESIGN=Shift.
```

Within-Subjects Factors

Measure: MEASURE_1

TimeChoice	Dependent Variable
1	Perceived_Choice.1.Traditional
2	Perceived_Choice.2.GFC
3	Perceived_Choice.3.Traditional

Between-Subjects Factors

		Value Label	N
Day or Night	1.0	Day	29
	2.0	Night	17

Descriptive Statistics

	Day or Night	Mean	Std. Deviation	N
Perceived_Choice.1.Traditional	Day	4.0989	.84546	29
	Night	4.1382	.65611	17
	Total	4.1134	.77343	46
Perceived_Choice.2.GFC	Day	4.5310	.79512	29
	Night	3.8676	.90914	17
	Total	4.2859	.88999	46
Perceived_Choice.3.Traditional	Day	4.2534	.80044	29
	Night	4.1647	.72603	17
	Total	4.2207	.76678	46

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
TimeChoice	Pillai's Trace	.007	.145[b]	2.000	43.000	.865	.007
	Wilks' Lambda	.993	.145[b]	2.000	43.000	.865	.007
	Hotelling's Trace	.007	.145[b]	2.000	43.000	.865	.007
	Roy's Largest Root	.007	.145[b]	2.000	43.000	.865	.007
TimeChoice * Shift	Pillai's Trace	.095	2.270[b]	2.000	43.000	.116	.095
	Wilks' Lambda	.905	2.270[b]	2.000	43.000	.116	.095
	Hotelling's Trace	.106	2.270[b]	2.000	43.000	.116	.095
	Roy's Largest Root	.106	2.270[b]	2.000	43.000	.116	.095

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
TimeChoice	.976	1.055	2	.590	.976	1.000	.500

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
TimeChoice	Sphericity Assumed	.212	2	.106	.166	.847	.004
	Greenhouse-Geisser	.212	1.953	.108	.166	.843	.004
	Huynh-Feldt	.212	2.000	.106	.166	.847	.004
	Lower-bound	.212	1.000	.212	.166	.686	.004
TimeChoice * Shift	Sphericity Assumed	3.003	2	1.501	2.352	.101	.051
	Greenhouse-Geisser	3.003	1.953	1.538	2.352	.103	.051
	Huynh-Feldt	3.003	2.000	1.501	2.352	.101	.051
	Lower-bound	3.003	1.000	3.003	2.352	.132	.051
Error(TimeChoice)	Sphericity Assumed	56.174	88	.638			
	Greenhouse-Geisser	56.174	85.917	.654			
	Huynh-Feldt	56.174	88.000	.638			
	Lower-bound	56.174	44.000	1.277			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2242.432	1	2242.432	3520.294	.000	.988
Shift	1.815	1	1.815	2.849	.099	.061
Error	28.028	44	.637			

Estimated Marginal Means (TimeChoice * Day or Night)

Estimates

Measure: MEASURE_1

TimeChoice	Day or Night	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	Day	4.099	.145	3.806	4.391
	Night	4.138	.190	3.756	4.520
2	Day	4.531	.156	4.217	4.845
	Night	3.868	.203	3.458	4.277
3	Day	4.253	.144	3.964	4.543
	Night	4.165	.188	3.786	4.543

Pairwise Comparisons

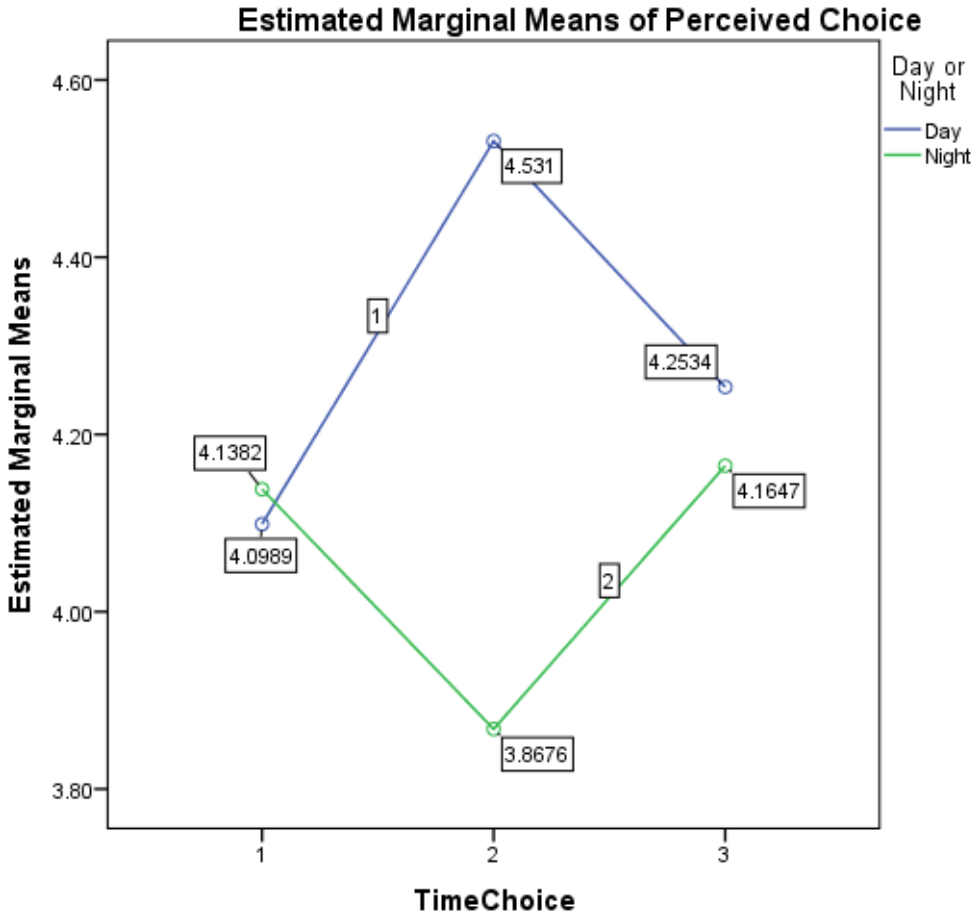
Measure: MEASURE_1

Day or Night	(I) TimeChoice	(J) TimeChoice	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Day	1	2	-.432	.223	.059	-.881	.016
		3	-.155	.212	.469	-.581	.272
	2	1	.432	.223	.059	-.016	.881
		3	.278	.194	.160	-.114	.669
	3	1	.155	.212	.469	-.272	.581
		2	-.278	.194	.160	-.669	.114
Night	1	2	.271	.291	.357	-.315	.857
		3	-.026	.276	.924	-.583	.530
	2	1	-.271	.291	.357	-.857	.315
		3	-.297	.254	.248	-.809	.214
	3	1	.026	.276	.924	-.530	.583
		2	.297	.254	.248	-.214	.809

Pairwise Comparisons

Measure: MEASURE_1

TimeChoice	(I) Day or Night	(J) Day or Night	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
1	Day	Night	-.039	.239	.870	-.521	.442
	Night	Day	.039	.239	.870	-.442	.521
2	Day	Night	.663*	.256	.013	.147	1.180
	Night	Day	-.663*	.256	.013	-1.180	-.147
3	Day	Night	.089	.236	.709	-.388	.565
	Night	Day	-.089	.236	.709	-.565	.388



Appendix 11 Learning outcomes ANOVA results

```
GET
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DATASET NAME DataSet1 WINDOW=FRONT.
GLM Score1_Trad_phase1 Score2_GFC_phase2 Score3_Trad_phase3 BY Shift
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  /POSTHOC=Shift(TUKEY)
  /PLOT=PROFILE(time*Shift)
/EMMEANS=TABLES(time*Shift) COMPARE (time)
  /EMMEANS=TABLES(time*Shift) COMPARE (Shift)
  /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=time
  /DESIGN=Shift.
```

Within-Subjects Factors

Measure: MEASURE_1

time	Dependent Variable
1	Score1_Trad_phase1
2	Score2_GFC_phase2
3	Score3_Trad_phase3

Between-Subjects Factors

		Value Label	N
Shift	1	Day	35
	2	Night	17

Descriptive Statistics

	Shift	Mean	Std. Deviation	N
Score1_Trad_phase1	Day	12.5714	2.85210	35
	Night	10.1176	4.02930	17
	Total	11.7692	3.44489	52
Score2_GFC_phase2	Day	10.0571	3.19874	35
	Night	7.0588	3.17156	17
	Total	9.0769	3.46323	52
Score3_Trad_phase3	Day	12.5714	3.74390	35
	Night	10.8235	3.87678	17
	Total	12.0000	3.83993	52

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
time	Pillai's Trace	.361	13.814[b]	2.000	49.000	.000	.361
	Wilks' Lambda	.639	13.814[b]	2.000	49.000	.000	.361
	Hotelling's Trace	.564	13.814[b]	2.000	49.000	.000	.361
	Roy's Largest Root	.564	13.814[b]	2.000	49.000	.000	.361
time * Shift	Pillai's Trace	.017	.422[b]	2.000	49.000	.658	.017
	Wilks' Lambda	.983	.422[b]	2.000	49.000	.658	.017
	Hotelling's Trace	.017	.422[b]	2.000	49.000	.658	.017
	Roy's Largest Root	.017	.422[b]	2.000	49.000	.658	.017

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
time	.976	1.201	2	.549	.976	1.000	.500

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	270.739	2	135.369	11.927	.000	.193
	Greenhouse-Geisser	270.739	1.953	138.647	11.927	.000	.193
	Huynh-Feldt	270.739	2.000	135.369	11.927	.000	.193
	Lower-bound	270.739	1.000	270.739	11.927	.001	.193
time * Shift	Sphericity Assumed	8.995	2	4.497	.396	.674	.008
	Greenhouse-Geisser	8.995	1.953	4.606	.396	.669	.008
	Huynh-Feldt	8.995	2.000	4.497	.396	.674	.008
	Lower-bound	8.995	1.000	8.995	.396	.532	.008
Error(time)	Sphericity Assumed	1135.005	100	11.350			
	Greenhouse-Geisser	1135.005	97.636	11.625			
	Huynh-Feldt	1135.005	100.000	11.350			

Lower-bound	1135.005	50.000	22.700			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	15234.441	1	15234.441	1214.480	.000	.960
Shift	197.723	1	197.723	15.762	.000	.240
Error	627.200	50	12.544			

Estimated Marginal Means (time * Shift)

Estimates

Measure: MEASURE_1

time	Shift	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	Day	12.571	.554	11.459	13.683
	Night	10.118	.794	8.522	11.713
2	Day	10.057	.539	8.974	11.140
	Night	7.059	.774	5.505	8.613
3	Day	12.571	.640	11.286	13.857
	Night	10.824	.918	8.979	12.668

Pairwise Comparisons

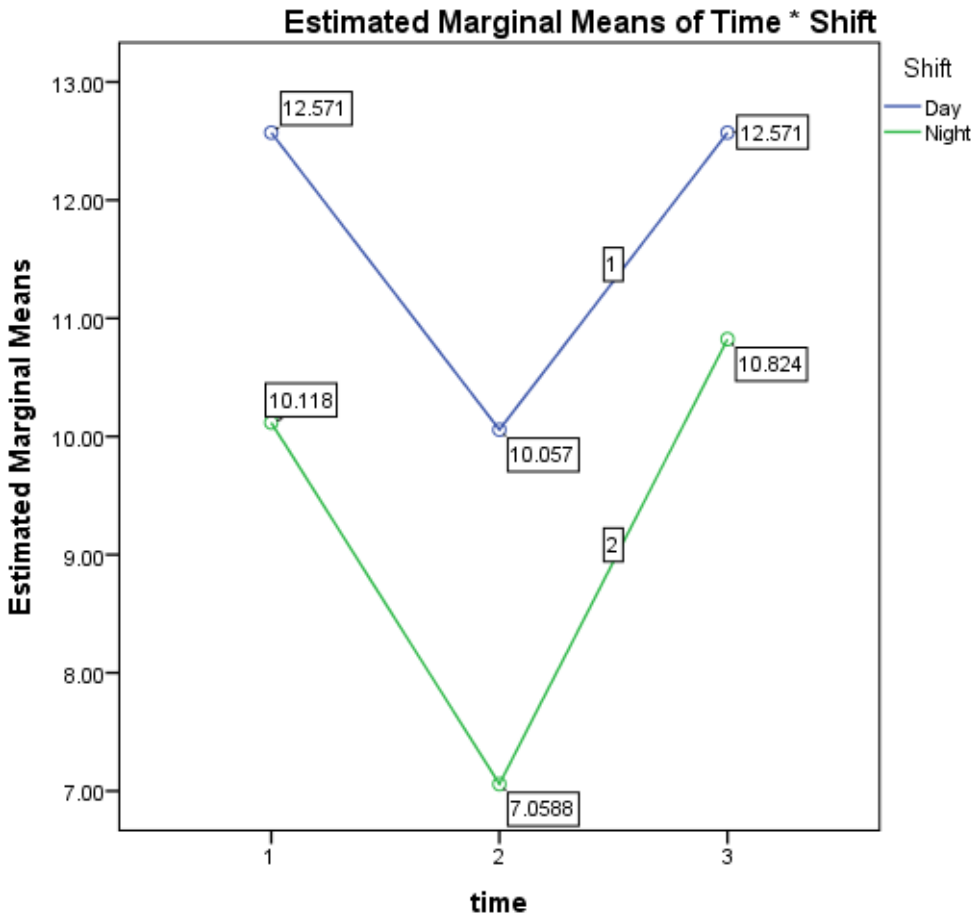
Measure: MEASURE_1

Shift	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Day	1	2	2.514*	.775	.002	.957	4.071
		3	1.776E-015	.866	1.000	-1.739	1.739
	2	1	-2.514*	.775	.002	-4.071	-.957
		3	-2.514*	.772	.002	-4.064	-.965
	3	1	-1.776E-015	.866	1.000	-1.739	1.739
		2	2.514*	.772	.002	.965	4.064
Night	1	2	3.059*	1.112	.008	.825	5.293
		3	-.706	1.242	.572	-3.201	1.789
	2	1	-3.059*	1.112	.008	-5.293	-.825
		3	-3.765*	1.107	.001	-5.988	-1.541
	3	1	.706	1.242	.572	-1.789	3.201
		2	3.765*	1.107	.001	1.541	5.988

Pairwise Comparisons

Measure: MEASURE_1

time	(I) Shift	(J) Shift	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
1	Day	Night	2.454*	.968	.014	.509	4.399
	Night	Day	-2.454*	.968	.014	-4.399	-.509
2	Day	Night	2.998*	.943	.003	1.104	4.893
	Night	Day	-2.998*	.943	.003	-4.893	-1.104
3	Day	Night	1.748	1.120	.125	-.501	3.997
	Night	Day	-1.748	1.120	.125	-3.997	.501



Appendix 12 Computer science students with the teacher (2018)