Higher Education in Morocco in the Covid-19 era: What perception of the usefulness and ease of use of e-learning ?

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Abstract: *The covid-19 pandemic has forced many education systems around the world to adopt e-learning as a mode of teaching and learning to limit the spread of the virus. Some universities and schools were already prepared while others were not. This paper presents a study conducted by a self-administered questionnaire. Its objective is to study the higher education student's perception of the usefulness and of the ease of use of e-learning in Morocco during the covid-19 pandemic period. Likewise, this study aims to investigate the impact of the previous two determinants on the intention to use e-learning as a learning mode after the current health crisis. Results showed that there are four categories of students: the supporters of e-learning, the opponents of e-learning, conditional supporters and the grateful one. Also, results show that the acceptance of e-learning and the intention of its use in the future by students for their learning is impacted positively by their perception of its ease of use and usefulness, which in turn is affected positively by its perceived ease of use.*

Key Words: **e-learning, Covid-19, High education, Morocco, TAM.**

1. INTRODUCTION

This The COVID-19 pandemic has led to the adoption of severe measures to combat the spread of the virus. Thus, social distancing measures to limit contamination led the Ministry of Higher Education in Morocco to announce the suspension of courses at various schools and universities in the public and private sectors from Mars 2020 until the end of the school year.

The Ministry insisted that these were not vacations but rather "virtual classes for closed schools" (BENSEDDIK, 2020). Therefore, to ensure pedagogical continuity for the academic year 2019/2020, universities and schools of higher education have used their e-learning platforms, such as: Blackboard, Microsoft Teams, Moodle, Zoom ... etc. In some universities and schools, students have already been introduced to the use of these platforms, but in others, they have discovered them and learned to use them during the lockdown period. Let us add that another category of students does not have means to acquire a smartphone, a tablet, a computer or an Internet connection. Our article will only deal with students who experienced the online learning experience during the Covid-19 health crisis.

This experience had many effects both in terms of pedagogical practices and in the perception of the usefulness and ease of use of e-learning. Thus, we will be interested in the study of the perceived usefulness and the perceived ease of use of e-learning by students of higher education in Morocco during the covid-19 era, and on the impact of these two variables on the acceptance of e-learning as a learning mode after the current health crisis.

The objective of this self-administered questionnaire study is to provide university managers with important information for their future plans to implement e-learning as a learning method.

2. LITERATURE REVIEW
2.1 E-learning and the Covid-19 crisis

In the time of Covid-19 pandemic, the imperatives of social distancing and lockdown, e-learning is the only possible method of learning and teaching. Thus, it can be defined as " a method of transmitting pedagogical knowledge through an electronic tool. It allows users to learn at their own pace and offers opportunities for interaction and collaboration between the different learners in an e-learning course. It can be used in completely distance learning situations, or in situations that alternate face-to-face and distance learning. In addition, the term "e-learning" is used in the majority of cases to refer to training using a computer connected to the Internet. " (BOUYZEM, 2019).

2.2 technology adoption

The issue of technology acceptance has been discussed since 1962. Thus, several theories and models have emerged: the Diffusion of Innovations Theory (Rogers, 2001), the Theory of Reasoned Action (Fishbein, M. and Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1991), the Social Cognitive Theory (Bandura, 1977), the Technology Acceptance Model (Davis, 1986), the GETAMEL (Abdullah & Ward, 2016). etc.

To address our problem, we have opted for the Technology Acceptance Model (TAM) as a reference model.
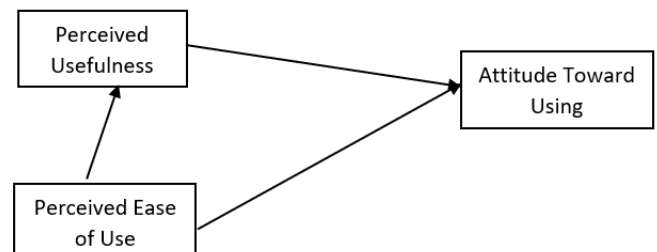

Figure 1: TAM Model (Davis, 1986)

The choice of this model is motivated by the following reasons:
- The field of our study: our subject is in the field of information systems. Therefore, the TAM is the most suitable model because it is considered to be "the most influential and popular theory in the field of the system. information and classified as an effective tool for empirical research (Chang, Chou and Yang, 2010, p. 1635)" "(Binh, 2014).
- Our research topic: we address the issue of e-learning acceptance. Thus, for this topic, the TAM is "the most common fundamental theory in e-learning acceptance literature" (Sumak, Heri_cko, & Pu_snik, 2011, p.2068). Moreover, it is considered the most common theory in research. existing on the acceptance of e-learning (Abdullah & Ward, 2016).
- The search for explanations of technology acceptance or rejection: TAM is a widely used model to explain technology acceptance and use among users (Cheng, 2011).
- The credibility, validity and robustness of TAM has been proven by numerous studies: in particular the meta-analysis carried out by King & He (2006) of 88 research papers that have used the TAM and that have proven the high credibility of TAM and showed that the "TAM to be a valid and robust model" (Abdullah & Ward, 2016).

3. METHODOLOGY

To conduct our study, we used the questionnaire survey via the "Google forms" tool.

3.1 Development of the questionnaire

The test questionnaire contains 19 questions, nine of which are taken from the GETAMEL model, five questions concerning demographic variables, four questions concerning the use of e-learning before and after the covid-19 crisis, and a final open question concerning their remarks and additions.

Furthermore, we have chosen the 5-point Likert scale as the measurement scale for the variables of the model.

In the table below, we detail for each variable:
- The original measurement indicators;
- The code for each measurement indicator;
- The reference.

Variables	Code	Items	Reference
Perceived usefulness (PU)	PU1	Using the e-learning would allow me to accomplish learning tasks more quickly.	(Abdullah et al., 2016)
	PU2	Using the e-learning would improve my learning performance.	
	PU3	Using the e-learning would enhance my effectiveness in learning.	
Perceived ease of use (PEOU)	PEOU1	Learning to use the e-learning would be easy for me.	(Abdullah et al., 2016)
	PEOU2	I would find it easy to get the e-learning to do what I want it to do.	
	PEOU3	My interaction with the e-learning would be clear and understandable.	
Behavioral intention (BI)	BI1	Assuming I had access to the e-learning, I intend to use it.	(Abdullah et al., 2016)
	BI2	Given that I had access to the e-learning, I predict that I would use it.	
	BI3	I plan to use the e-learning in the future.	

Table 1: Items of questionnaire

3.2 Data collection

The questionnaire was distributed to higher education students with the help of teachers and using the social network Facebook in the different university student groups. Thus, we opted for a convenience sample.

The questionnaires were self-administered between 16 and 21 June 2020 using the google forms tool. The choice of this method of administration is due to the following reasons:
- It is quick, convenient and ensures the anonymity of respondents, which can increase the response rate (Thietart et al, 2014).
- Students can access the survey online at a time and place that is convenient for them (Aldunate & Nussbaum, 2013).
- The Internet is an undeniable tool offering the best response times (Moscarola & Ganassali, 2006).
- The electronic questionnaire allows for continuous, real-time monitoring of the evolution of responses (Thietart et al, 2014).

3.3 Data Analysis

We used SPSS 24 and Smart PLS in order to analyze data collected.

4. RESULTS

We received 331 responses distributed as follows:

		Nombrer	Frequency
Study Level	PhD Students	10	3,0
	Bachelor	190	57,4
	Master	131	39,6
Type of training	Continue / Executive	38	11,5
	Initial training	293	87,0
Age of respondents	20 - 25 years	225	68,0
	25 - 30 years	44	13,3
	Less than 20 years	48	14,5
	More than 30 years	14	4,2
Gender	Women	213	64,4
	Men	118	35,6

Table 2: Distribution of Respondents

4.1 Descriptive analysis of results

Before the Covid-19 health crisis, 55% of respondents had never taken any online training, while during this crisis 96.7% said they took online courses. As a result, the percentage of students who pursue online training increased from 45% to 96.7%, which means 51.7% more users during the lockdown period.

Regarding the perceived usefulness of e-learning, 61.3% of the respondents find that the use of e-learning allows them to achieve learning quickly, 65.2% strongly agree that the use of e-learning improves learning performance and 68.9% state that the use of e-learning improves their effectiveness in learning.

The analysis of the perceived ease of use responses showed that 78.5% of the respondents find that learning to use e-learning is easy for them, 78.8% say that e-learning allows them to follow what they want and 68.3% agree and strongly agree that their interaction with e-learning is clear and understandable.

On the other hand, the intention to use e-learning as a mode of learning after the Covid-19 crisis if they have access to it was confirmed by 69.8% of the respondents and 66.5% affirmed their intention to use e-learning in the future.

4.2 Analysis of respondents' comments

We identified 58 comments and additions from respondents. These are divided into four categories:

- The supporters of e-learning: they find that e-learning is "pleasant", "efficient", "beneficial" and "very useful" especially in contexts such as what we experienced during this pandemic period linked to Covid-19. Likewise, they noted that they "interact well" with the teachers and that this experience has improved their "e-learning skills and ability".

- The opponents of e-learning: they find that e-learning is "less effective" than face-to-face courses, "very tiring", "insufficient", "difficult", "eliminates real communication"

and "makes the student passive, unable to act and to communicate".

For some of them, it is acceptable to take online courses because "it was the only solution in the period of lockdown" but remains "less effective". Moreover, they mentioned the diversity of student characters, between "serious" and "not serious", specifying that e-learning is not suitable for the latter category. In conclusion, for the opponents, e-learning "can never replace face-to-face classes".

- Conditional supporters: These respondents find e-learning a 'pleasant' as a training method but the conditions are not favorable:

- The quality of the Internet connection: respondents noted that "poor connection" and "fluctuations in the quality of internet speed" complicate and "stress" them during the learning process,
- The means: some respondents explained that they have neither the technical means (computers, tablets, internet ...) nor the financial means to provide or to make each time "internet refills" especially that "the platforms used needs high speed"
- Teachers: Respondents mentioned that some teachers were able to adopt their teaching methods to online teaching which "allowed students to enjoy the online courses", while other teachers did not change their face-to-face classroom practices which "made students uncomfortable" and made "the lockdown period and online courses unpleasant".

- The grateful: These respondents did not express any opinions, but they wanted to express their "gratitude" and "deep appreciation" to their teachers for their efforts during the lockdown period and online teaching.

4.3 Evaluation of the measurement model (External model)

The measurement model will be evaluated by convergent validity analysis and discriminant validity analysis.

4.3.1. Estimation of internal reliability

Internal reliability is "verified when, used several times under the same conditions, an instrument gives the same results" (Touzani, 2014). It is usually measured by the coefficient of Cronbach's alpha (α), thus, the closer this indicator is to 1, the higher the reliability.

	Cronbach's Alpha
Perceived ease of use	0,787
Intention of use	0,801
Perceived usefulness	0,877

Table 3: Cronbach's Alpha

For our study, the results obtained indicate an excellent reliability of our analysis model.

4.3.2. Convergent validity analysis

The validity of a measure means that "the instrument measures the construct it is supposed to actually measure (Evrard et al, 1997)".

For the analysis of convergent validity, we will use the "loading factors", "composite reliability (CR)" and "average variance extracted (AVE)".

As shown in the table below, all loading factors are greater than 0.7 (HAIR, HULT, Ringle, & SARSTEDT, 2008)

	Items	Factors loading	Composite Reliability	(AVE)
Intention of use	BI1	0,879	0,876	0,702
	BI2	0,843		
	BI3	0,814		
Perceived ease of use	PEOU1	0,789	0,883	0,715
	PEOU2	0,838		
	PEOU3	0,883		
Perceived usefulness	PU1	0,862	0,924	0,803
	PU2	0,917		
	PU3	0,908		

Table 4: Convergent validity analysis

4.3.3. Discriminant validity Analysis

Discriminant validity « is obtained when indicators that are supposed to measure different phenomena are weakly correlated with each other" (Touzani, 2014).

	Perceived ease of use	Intention of use	Perceived usefulness
Perceived ease of use	0,838		
Intention of use	0,695	0,846	
Perceived usefulness	0,733	0,696	0,896

Table 5: The table of inter-item correlations

The table of inter-item correlations above indicates a low correlation between the indicators of the different variables, which confirms the discriminant validity of our research model.

To further confirm the discriminant validity of our model, we will analyze the factorial contributions of the measurement indicators of each variable. For this purpose, we use the "cross loading table" extracted from the Smart-Pls software.

The table below indicates that the measurement indicators are strongly loaded with their corresponding factor more than with the other factors. Therefore, we conclude that the discriminant validity of our measurement model is provided by the evidence of cross loading.

	Intention of use	Perceived ease of use	Perceived usefulness
BI1	0,879	0,661	0,615
BI2	0,843	0,572	0,574
BI3	0,814	0,523	0,577
PEOU1	0,514	0,789	0,529
PEOU2	0,610	0,838	0,661
PEOU3	0,615	0,883	0,640
PU1	0,625	0,620	0,862
PU2	0,615	0,646	0,917
PU3	0,631	0,701	0,908

Table 6: Cross-loading Table

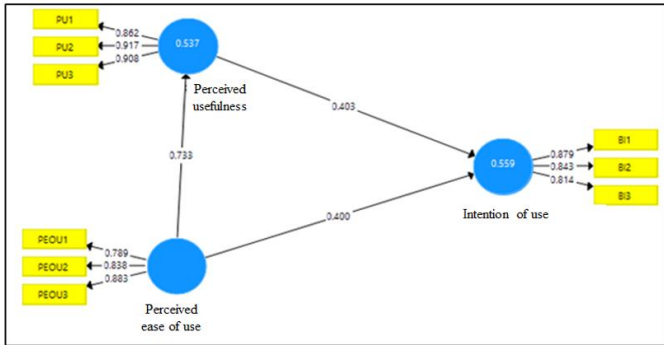Our research model represented under Smart-PLS is shown below:

Figure 2: Search model under Smart-Pls

4.4 Evaluation of the structural model

We will assess the structural model using four tests, namely:
- Test of the hypotheses
- Test of the coefficient of determination R2
- Test F2 (Effect Size)
- Predictive Relevance Q2

4.4.1 Testing the hypotheses

Testing these hypotheses with the Smart-PLS software allowed us to confirm the three hypotheses of our research model.

Hypotheses	Initial sample (O)	Sample mean (M)	(STDEV)	T-Value (|O/STDEV|)	P-Value
Perceived ease of use -> Intention of use	0,400	0,404	0,067	5,956	0,000
Perceived ease of use -> Perceived usefulness	0,733	0,734	0,030	24,772	0,000
Perceived usefulness -> Intention of use	0,403	0,400	0,069	5,810	0,000

Table 7: hypothesis test

The table above shows that:
• Perceived ease of use of e-learning positively influences perceived usefulness of e-learning.
• Perceived ease of use of e-learning has a positive influence on intention to use e-learning in the future.
• Perceived usefulness of e-learning has a positive influence on intention to use e-learning in the future.

4.4.2. Test of the coefficient of determination R2

Hair (2008) explained that the most commonly used measure to evaluate the structural model is the coefficient of determination (R2 value).

Chin (1998) explained that a value between 0.33 to 0.67 for R2 is medium in explaining the variable.

Construct	R²	Results
Intention of use	0,559	Medium
Perceived usefulness	0,537	Medium

Table 8: coefficient of determination R2

4.4.3. Test F2 (Effect Size)

Cohen (1980) explained that "Guidelines for assessing ƒ2 are that values of 0.02, 0.15, and 0.35, respectively, represent small, medium, and large effects of the exogenous latent variable. Effect size values of less than 0.02 indicate that there is no effect" (cited by HAIR, HULT, Ringle, & SARSTEDT, 2008).

Hence, and as shown in the table below, we would consider the effect size of constructs "Perceived ease of use" and "Perceived usefulness" on the endogenous latent variable "Intention of use" as medium.

Effect size	Intention of use	Perceived usefulness
Perceived ease of use	0,168	1,159
Perceived usefulness	0,171	

Table 9: Test F2 (Effect Size)

4.4.4. Predictive Relevance Q2

The Predictive relevance Q2 is "an indicator of the models out-of-sample predictive power or predictive relevance." (Cited by HAIR, HULT, Ringle, & SARSTEDT, 2008).

As shown in the figure 3, Q2 values are
- 0.406 for "perceived usefulness"
- 0.377 for "intention of use",

Thus, Hair (2008) explained that "Q2 values larger than 0 suggest that the model has predictive relevance for a certain endogenous construct. In contrast, values of 0 and below indicates a lack of predictive relevance".
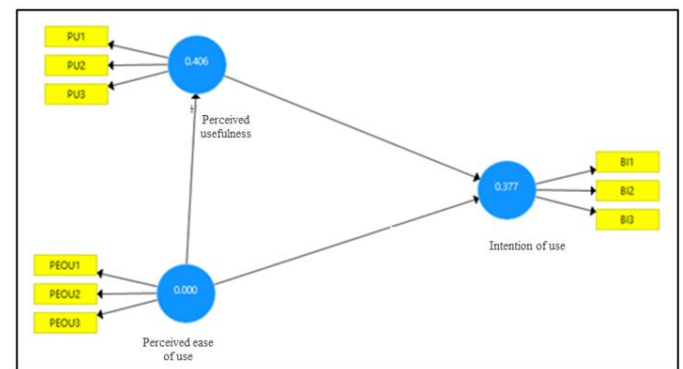

Figure 3: Q2 of the research model under Smart-Pls

	SSO	SSE	Q² (= 1-SSE/BSP)
Perceived ease of use	993,000	993,000	
Intention of use	993,000	618,763	0,377
Perceived usefulness	993,000	590,087	0,406

Table 10: Predictive Relevance Q2

5. CONCLUSIONS

The covid-19 pandemic has forced many education systems around the world to adopt e-learning as a mode of teaching and learning to limit the spread of the virus. Some universities and schools were already prepared while others were not.

As for Morocco, the Ministry of Higher Education has put a lot of effort into making this educational experiment a success. Thus, all universities and colleges, both public and private, were mobilized to ensure pedagogical continuity during the period of the health crisis. As a result, several pedagogical practices were used (synchronous / asynchronous teaching).

However, the results of our study show that 3.3% of respondents did not have access to online courses during this period, due to lack of technical or financial resources. Although in appearance this figure represents a minority, it is emphasized that the survey sample was recruited online!

The acceptance of e-learning and the intention of its use in the future by students for their learning is conditioned by their perception of its ease of use and usefulness, which in turn is affected by its perceived ease of use. Thus, e-learning can be perceived as useful if it is perceived as easy to use. We therefore recommend that higher education institutions assist students in their e-learning process through training about the use of the e-learning platform or by producing videos explaining how to use e-learning platforms.

In conclusion, we can say that e-learning can be used as a support for face-to-face training but can never replace it. many factors can constitute an obstacle to the adoption of e-learning as a training mode, we cite, for example, the lack of infrastructure, absence of stable broadband connection and resistance to change.

REFERENCES

Abdullah, F., & Ward, R. (2016). Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, *56*, 238–256. https://doi.org/10.1016/j.chb.2015.11.036

Abdullah, F., Ward, R., & Ahmed, E. (2016). Computers in Human Behavior Investigating the in fl uence of the most commonly used external variables of TAM on students ' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in Human Behavior*, *63*, 75–90. https://doi.org/10.1016/j.chb.2016.05.014

Ajzen, I. (1991). The Theory of Planned Behavior. *ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES*, *50*, 179–211.

https://doi.org/10.1922/CDH_2120VandenBroucke 08

Aldunate, R., & Nussbaum, M. (2013). Teacher adoption of technology. *Computers in Human Behavior*, *29*(3), 519–524. https://doi.org/10.1016/j.chb.2012.10.017

Anh-Duc, L. (2012). *Analyse stratégique et impacts de performance des sites web dans l'hôtellerie française indépendante*. Université de Toulouse.

Bandura, A. (1977). Self-efficacy : Toward a Unifying Theory of Behavioral Change. *Psychological Review*, *84*(2), 191–215.

BENSEDDIK, M. (2020). L'Université marocaine à l'épreuve du Covid 19. *Le Libellio*, *16*(3), 1–28. Retrieved from http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fc gi?dbfrom=pubmed&id=19934406&retmode=ref&c md=prlinks

BOUYZEM, M. (2019). *Les déterminants à l'adoption du e-learning dans l'enseignement supérieur au Maroc. Cas des enseignants et des étudiants de l'Université Abdelmalek Essaâdi.*

Davis, F D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results.* Massachusetts Institute of Technology. https://doi.org/oclc/56932490

Davis, Fred D. (1989). Perceived Usefulness , Perceived Ease of Use , and User Acceptance of lnformation Technology. *MIS Quarterly*, *13*(3), 319–340. Retrieved from http://links.jstor.org/sici?sici=0276-7783%28198909%2913%3A3%3C319%3APUPEOU %3E2.0.CO%3B2-E MIS

Fishbein, M. and Ajzen, I. (1975). Belief, attitude, intention and behaviour: An introduction to theory and research.

HAIR, J., HULT, T., Ringle, C., & SARSTEDT, M. (2008). *A primer On Partial Least Squares Structural Equation Modeling (PLS-SEM). SAGE Publications, Inc.* https://doi.org/10.1017/CBO9781107415324.004

Longjun, Z., Fangmei, L., Shanshan, W., & Ming, Z. (2020). School's Out, But Class's On", The Largest Online Education in the World Today: Taking China's Practical Exploration During The COVID-19 Epidemic Prevention and Control as An Example. *Journal of Chemical Information and Modeling*, 501–519. https://doi.org/10.15354 / bece.20.ar023

Moscarola, J., & Ganassali, S. (2006). PROTOCOLES D'ENQUÊTE ET EFFICACITE DES SONDAGES PAR INTERNET.

Rogers, E. M. (2001). Theory of Innovation. *Encyclopedia of the Social & Behavioral Sciences*, 7540–7543. https://doi.org/https://doi.org/10.1016/B0-08-

043076-7/01900-8

Thietart et al, R. (2014). *Raymond-Alain Thietart et al.* (DUNOD, Ed.) (4ème éditi).

Touzani, M. (2014). Le processus de validation des échelles de mesure: fiabilité et validité. In *Séminaire de Méthodologie de Recherche di ligue, Tunis, Janvier 2000.*

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, *39*(2), 273–315. https://doi.org/10.1111/j.1540-5915.2008.00192.x

Annexes
Questionnaire of the study

1. Have you already taken online training before the health crisis?
- Yes
- No
2. If so, on which platform
- Teams
- Youtube
- Live RS
- Hangout
- Skype
- MOOC
- Blackboard
- ZOOM
- France Université Numérique (FUN)
- Coursera
- Open Classrooms
- Udacity
- Other (s) to be specified)

3. What tool do you use for e-learning during the health crisis period ?
- Blackboard
- Youtube
- Mooc
- Lives sur les réseaux sociaux
- Hangout
- Hangout
- Skype
- ZOOM
- France Université Numérique (FUN)
- Coursera
- Open Classrooms
- Udacity
- Other (s) to be specified)

4. Are you currently taking a training course :
- Face-to-face
- From a distance
- In hybrid mode

5. Check the box that most closely matches your opinion :

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Using the e-learning would allow me to accomplish learning tasks more quickly					
Using the e-learning would improve my learning performance.					
Using the e-learning would enhance my effectiveness in learning.					
Learning to use the e-learning would be easy for me.					
I would find it easy to get the e-learning to do what I want it to do.					
My interaction with the e-learning would be clear and understandable.					
Assuming I had access to the e-learning, I intend to use it.					
Given that I had access to the e-learning, I predict that I would use it.					
I plan to use the e-learning in the future.					

6. Your study level:
- Bachelor
- Master
- MBA
- Executive Study

7. Type of training
- academic training
- executive training

8. Your Speciality
- Business Administration
- Tourisme
- Finance
- Marketing
- Sport
- Project Management
- Economic intelligence
- Other (s) to be specified)

9. Your age
- Less than 20 years
- Between 20 and 25 years old
- Between 25 and 30 years old
- Over 30 years

10. You are :
- A man
- A woman

11. Do you have any remarks or additions ?