The Effects of Training on Sustainable Development Practices in Higher Education: The case of Ibn Tofail University in Kénitra (Morocco)

MUSTAPHA KOUZER*, ABDELAZIZ CHAOUCH, EL MAHJOUB AOUANE, KELTOUM RAHALI

Laboratory of Agrophysiology, Biotechnology, Environment and Quality, Faculty of Sciences, Ibn Tofail University in Kénitra Kénitra, 14000 MOROCCO

NOURA ETTAHIR, ABDERRAZZAK KHOHMIMIDI, ABDELLATIF ELOUALI, ADIL AMMAR Higher School of Technology of Salé Mohammed V University in Rabat BP, 227 Salé, 11000

MOROCCO

Abstract: - The objective of this article is to study the existing relationship between training and the integration of Sustainable Development (SD) practices in the Moroccan University. The issue at stake is to verify whether the training provided at the level of higher education institutions responds to the various worldwide challenges. In order to respond to the difficulties that impact the higher education model, Moroccan universities are invited to rethink their various approaches so that they can respond to the economic, social, societal and environmental constraints which are constantly evolving. Therefore, these universities must align themselves with the major challenges facing education today[1].

The empirical research method used in this quantitative study is a Likert's scale based questionnaire. The investigation was carried out on a sample of 134 teachers-researchers of Ibn Tofail University of Kénitra (ITUK) (Morocco). The investigated sample population was surveyed during the time period lasting from February the 1st to May the 31th, 2021.

The analysis conducted regarding the results of the ANOVA of the variables reveals that the pedagogical approaches, curriculum and teaching methods are significant except for the teaching activities which display a value of 0.280 higher than the recommended threshold.

Consequently, training in higher education can contribute to forging attitudes in the future in line with SD's requirements by relying on pedagogical approaches. Hence, the University through training should contribute to a sustainable society in order to meet the 17 SD Goals which require that by 2030 all students should have the knowledge, skills and attitudes necessary to promote sustainable development.

The results of this research will contribute to the development of new training curricula that meet the requirements of the various SD objectives. We have focused our research on the ITU Kénitra, we believe that our approach will serve as a basis to develop other cases of Moroccan universities to have an overall vision of training curricula converging towards the practices of SD at the Moroccan national level and for a better contribution in the new 2035 nationwide development model[2].

Key-Words: - Training, Sustainable Development, Sustainable Development practices, Higher Education, Ibn Tofail University Kénitra, Morocco

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1 Introduction

One of the main missions of the education and training sector is the preparation of future upcoming generations to face the major challenges of today and tomorrow. Higher education is mandated to perpetuate the process of development in general and Sustainable Development (SD) in particular by working towards the implementation of SD practices in the university that has become a powerful engine of innovation and economic, social and cultural changes.

Training provides the knowledge, skills, attitudes and values needed to build a sustainable future[3].Thus, several challenges have been taken up in order to steer the training curricula of higher education institutions towards strengthening innovative practices for learning, research and knowledge development.

Several research papers have focused on the subject, for instance some works emphasized the driving role of the university in using new technologies in the educational process in order to transform the forms of students' learning patterns and attitudes, especially when it comes to learning that must converge towards the acquisition of new SD practices[4].

At the same time point out that education is also seen as one of the main drivers of economic growth. We share this view in the sense that economic growth is a key component of SD[5].

Most research on SD in Moroccan universities has been limited to perceptions and not to practices[6]. We therefore consider that our study focusing on the Moroccan university will be of great benefit because it will allow us:

- To have the opportunity to analyze the curriculum, activities, methods and approaches used by university teachers for this purpose.
- To assess SD actions integration and implementation degree in higher education institutions.

In addition, by committing to the 17 SD Goals[7], the university is required to ensure that all students possess the necessary knowledge and skills to promote the SD objectives through their training and academic curricula.

In the same perspective, Ibn Tofaïl University of Kénitra (ITUK) has been involved and committed to social and societal responsibility through the quality of its training, research, teaching, knowledge transfer and governance. Moreover, for the third consecutive year, (ITUK) has been distinguished in the prestigious universities' international ranking "Times Higher Education Impact Ranking 2021"[8] where more than 1115 universities participated in the 2021 edition, representing 94 countries. Another distinction of ITUK is the "Affordable and Clean Energy" [9] objective, where it was ranked 9th in the world (45th rank in 2020), first at national scale, Africa and the Arab countries.

The University is currently at the heart of our country's social project, because of the missions it undertakes in the training of future citizens, the achievement of the National Strategy for Sustainable Development (NSSD) objectives and, the guarantee of the right to education for all. It is in this regard at the centre of national priorities and concerns. It is a catalyst for the knowledge economy and must therefore ensure training by producing knowledge that is useful not only for the labour market, but above all for the needs of a qualified workforce and for the personal development of both women and men. It is widely admitted that training through education is a sine qua non for countries development. It is, according to the World Declaration on Education for All (1990), "an indispensable, if not sufficient, condition for the development of the individual and society" [10] as it can help "improve global security, health, prosperity and ecological balance, while promoting social, economic and cultural progress, tolerance and international cooperation".

In this respect, education plays the role of a lever for SD objectives, considered as a key element in rethinking the world in a different way, developing new ways of understanding it, and developing a new way of acting, according to Nelson Mandela's famous saying "Education is the most powerful weapon you can use to change the world"[11].

In November 2014, UNESCO and the Japanese government hosted the World Conference on Education for SD: "Learning Today for Sustainable Development" [12]. Therefore, the university plays an important role through "research, teaching and practice, higher education has a key role to play in achieving sustainable development" [13]. Indeed, sustainable higher education is not limited to 'simply' adding SD to existing curricula structures, but should focus on fundamental changes in thinking, research and teaching methods. In other words, SD is not an additional subject to be integrated into the curriculum, but a starting point for a new look at curricula, pedagogy, organization, policy and lifestyle[14].

In this respect, the subject has always attracted the attention of scientists, academics, industrialists, politicians and society in general, as one only has to review the literature on academic, scientific and social issues to note the importance of this approach to SD in academia, also in the light of the social and societal changes that the world is currently experiencing.

The term sustainable development (SD) is differently defined by various authors. Several questions are currently raised, without clear answers, about its signification or definition. And, above all, the implication of SD in development theory and practice [15]. Development in this sense aims to achieve social progress, environmental balance and economic growth [16],[17].

In the same perspective, and as underlined by Gro Harlem Brundtland in her report "Our Common Future"[18], the World Commission on Environment and Development (WCED) has addressed the younger generations directly and in a special way. In this regard, WCED emphasized the crucial role that teachers and scientists around the world must play in spreading the message to the younger generation. We hereby, remember this excerpt aimed at educational institutions and clarifying their role in the development of a better world: "We appeal to citizens' groups, non-governmental organizations, educational institutions and the scientific community. In the past, they have all played an indispensable role in public education and policy change. They will now play an equally crucial role in guiding the world on a path of development that is sustainable, laying the foundations for all our future"[16], [19].

In this respect, SD is automatically linked to education and training for SD. According to Arnaud Diemer [20] SD cannot be discussed without raising the educational issue, the way of thinking at the pedagogical level, and how knowledge and knowhow, and even a new model of life in society, can be passed on to future generations.

Moreover, at the Nagoya Summit [20] a declaration called for urgent action to further strengthen and intensify education for SD to enable present generations to meet their needs, while enabling future generations to meet theirs, through a balanced and integrated approach to the economic, social and environmental dimensions of SD.

Therefore, and in order to understand this topic, we present in the following sections our empirical investigation approach.

2 Methodology

In a context marked by debates and controversies, this paper examines the roles of training in higher education SD practices, in order to open up a reflection window on how to achieve effective SD practices in the Moroccan academic institutions.

We have adopted an empirical method based on a quantitative study essentially using a questionnaire as a data collection tool. The questionnaire's elaboration took into account the curricula's teachers degree of satisfaction with regard to the (course and content of the teaching programs dedicated to SD, as well as the inter-departmental collaboration in training programs related to SD). In developing the questionnaire's components, we have taken into consideration the teachers' opinions on the methods and pedagogical approaches used in the teaching process.

The aim is to present the results of an investigation that was realized in ITUK, an academic entity that possess numerous considerable assets and has achieved a prestigious performance represented by international community recognition, , besides the commitment this university to social and environmental responsibility. The survey lasted three (03) months starting the first February and ending on April the 30th (2021).

2.1 The target population

ITUK is a Moroccan public university located in the Kénitra city (Morocco's western region). Founded in 1989, it offers training courses leading to officially recognized higher education diplomas, such as prebachelor's degrees (i.e. certificates, diplomas, and associated diplomas or basic diplomas) in several study fields. It is keen to assert its positioning and display its values which allow it to embody a Green and Open University identity [21].

ITUK holds several branches and institutions. It is constituted of five faculties, five schools and a Sports' Professions Higher Institute. Besides, the university has continued to grow and develop both in terms of training provided, infrastructure and human resources as shown in the following table.

Table 1: The different e	ntities of ITUK
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Centers of expertise	Establishments
Science and Techniques	Faculty of ScienceHigh School of TechnologyNational School of Chemistry
Engineering Sciences	National School of Applied Sciences
Humanities and Social Sciences	Institute of Sports Professions
Law, Economics and Management Sciences	 Faculty of Law and Political Sciences Faculty of Economics and Management National School of Business and Management
Humanities and Social Sciences	 Faculty of Humanities and Social Sciences Faculty of Languages, Literature and Arts
Education Science	• Higher School of Education and Training

2.2 Study tools

To carry out this investigation, we have proceeded to the elaboration of different headings that constitute our questionnaire in order to grasp the well-founded of the various SD practices in the training within the university.

The data collection tool used is the questionnaire, which is the most appropriate quantitative data gathering tool yet numerous authors like [6], [22] have been interested in the study of different quantitative tools for the diagnosis and evaluation of SD at the level of higher education institutions.

These studies all tend to examine and analyze the efforts made to determine SD integration level in higher education, which led us to contextualize this type of investigation at the Moroccan scale.

We have conducted our questionnaire's pre-test among a sample of 10 university professors, from two different institutions. These professors perform many tasks as managers and heads of departments effectively active in SD field. The pre-test allowed us to check the questionnaires' fluidity and therefore improve its final version by integrating all the necessary components.

2.3 Questionnaire's variables components

These components can be summarized as follows:

- The integration of SD as modules or module elements in the teaching specifications;
- The commitment of the university's institutions to SD;
- The curriculum and teaching acts;
- The pedagogical approaches used in teaching;
- The development of values and skills of university students.

We have adopted the quantitative method by formulating 54 items among the set of items previously identified in the literature review mobilizing a Five-Level Likert's scale [23].

2.4 Sampling

We have based our study on a 400 ITUK teachersresearchers sample, 134 of whom have effectively participated in the survey. The size of the sample is thus representative, since it exceeds one-seventh (1/7) of the parent population of 620 teachers [24].

2.5 Processing phase: Exploratory Factor Analysis

In order to construct the model related to training and its implications on SD practices, several phases are elementary. In a first step, it is essential to verify the content validity of the training measurement scale of the two variables: an Explanatory variable that is represented as "training" and an explanatory variable identified as "SD practices". In order to construct our measurement scale, we have first determined the four dimensions of the variable "Training", namely curriculum, approaches, teaching methods and teaching activities. Then, we checked the prerequisites and used Principal Component Analysis (PCA) to extract the appropriate number of factors. Furthermore, we have performed the Varimax rotation, interpreted the factors and assessed the content validity of the training measurement scale. The aim of content validity tests is to check whether the various questionnaire items represent the concept under examination [25] before they are cleaned up.

The factor structure and psychometric qualities of the training and SD practices scale were analyzed using SPSS 23 software, and the data were subjected to Principal Component Analysis (PCA) with Varimax rotation in order to test the dimensionality of the construct.

The PCA analysis of the four dimensions of training is considered desirable in order to reduce the number of items and retain only those that allow the phenomenon to be characterized, in particular to identify the main factors (Costello and Osborne, 2005; Fabrigar et al.1999; Roussel, 1996). The correlation matrix was calculated from the raw data (individual scores on the different variables). The purging of items deemed unsatisfactory was carried out based on the following elimination parameters: rejection of items with a factor score below 0.3 and those with a high factor score on several factors [26]. The internal consistency reliability of the scale and its different dimensions was assessed by analyzing Cronbach's alpha.

We have equally realized the analysis by multiple linear regression in order to study the causality between a dependent variable Y and K and other independent variables (X1, X2,Xk). Thus the algebraic model developed is the following:

 $yi = \beta 0 + \beta 1x1i + \beta 2x2i + \dots + \beta px + \varepsilon i \qquad (1)$

In our case, Y=SD practices; X1=Curriculum; X2=Pedagogical approaches; X3= Pedagogical methods; X4= Teaching activities.

2.6 The multiple linear regression analysis process:

- Estimation of the regression coefficients β0, β1, β2i+...+βp (ordinary least squares (OLS) method).
- Quality model measure R2 (coefficient of determination); R2 = SC reg/SCtot; 0<R2<1.
- Check whether the marginal contribution of each Xj to the explanation of Y is significant (Student's test).

• Choice of the optimal model and discussion of the results according to the literature.

2.7 Hypotheses formulation

H1: The curriculum has a significant effect on SD practices.

H2: Pedagogical approaches have a significant effect on sustainable development practices.

H3: The more diversified the teaching methods, the more they impact SD practices.

H4: Teaching activities have a direct impact on SD practices.

At the end of the methodological approach adopted, our investigation revealed qualitative characteristics such as the nature of the institutions and their departments, which we present below before proceeding to discuss our results.

3 Results and discussion

The collected results allowed us to highlight the SD practices. We worked then on 4 dimensions of training (explanatory variable) which are:

- 1 Curriculum.
- 2 Pedagogical approaches.
- 3 Teaching methods.
- 4 Teaching activities.

As for SD practices (variable to be explained), it is represented by:

- 1 The university's vision and actions towards SD.
- 2 Types of collaboration favoring sustainable development teaching.
- 3 The expertise and willingness of ITUK teaching staff to participate.

With regard to the survey's participation rate of the institutions, as well as the departments involved, we present the data collected in this graphic:



Fig. 1: ITUK's academic institutions.

The second graph prensents the various Institutional Departments at ITUK.



Fig. 2: Institutional departments at Ibn Tofaïl University

We have adopted an exploratory approach to determine the training dimensions and sustainable development practices and check for inter-item correlations. Then, we have measured the adequacy of the Kaiser-Meyer-Olkin (KMO) sampling and Bartlett's Sphericity Test, the results of which for each dimension are shown below:

3.1 Training

3.1.1 The Curriculum component

After checking the inter-item correlations of the Curriculum dimension of the Training variable, the results show that the KMO index is $0.649 \sim 0.7$ which is acceptable. We found that the data for this dimension are factorable. The result of Bartlett's test of sphericity are also significant as p = 0.000 is below the threshold which is < 0.005 (Table 2). The Chi-square is 71.082 and the ddl is 3, which shows the existence of a good relationship between the different items that make up this dimension as a whole.

Table 2: KMO index and Bartlett's test of sphericity forthe Curriculum dimension

Kaiser-Meyer-Olkin index sampling quality.	for measuring	0.649
	Chi-Two approx.	71.082
Bartlett Sphericity Test.	ddl	3
	Meaning	0.000

In order to extract the appropriate number of factors for our dimension, we have first analyzed the total variance explained table and found that only one component has an eigenvalue higher than 1. This factor alone explains 62.332% of the total variance of the analysis (Table 3).

Table 3: Total explained variance of the dimension

Co	mnonent	1	2	3
Initial Eigen	Total	1.87	0.656	0.474
Values	% of the variance	62.33	21.86	15.81
	% Cumulated	62.33	84.19	100
Sums	Total	1.87		
extracted	Variance %	62.33		
from the	% Cumulated	62.22		
load square	70 Cumulated	02.33		

Curriculum

We observe that the three items values: (presence at departmental level of courses integrating SD topics, the hourly volume allocated to courses and the degree of inter-departmental collaboration in the teaching of SD programmes) are between 0.757 and 0.839, which gives them an acceptable significance (Table 4).

T-1-1- 4.	T1	Commission 1	4		
Table 4:	Ine	Curriculum	aimension	components	matrix

	Items	Component 1
C1	Presence of courses at departmental level integrating Sustainable Development topics.	0.770
C2	Large amount of time allocated to these courses.	0.757
C3	The degree of inter-departmental collaboration in the teaching of sustainable development programmes.	0.839

In addition, we have calculated the Curriculum dimension Cronbach's alpha of the Training variable, which shows a value of 0.697 that is close to 0.7. This qualifies it as excellent according to (Nanay, 1978).

Table 5: Reliability statistics

Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of elements
0.697	0.697	3

Therefore, we can say that for this scale composed of three items (C1, C2 and C3) we obtain a satisfactory internal consistency. We can indeed see that the consistency is maximized by keeping the three items, because if we discard one of them, the consistency will decrease. Thus, the Cronbach's Alpha value, in case of deletion of one item, is less than 0.697.

Table 6: Total element statist	ics
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	Scale average when an item is deleted	Variance of the scale when an element is deleted	Full correl ation of correc ted items	Squar e of the multip le correl ation	Cronbach 's Alpha when the item is deleted
C1	5.45	3.130	0.488	0.255	0.637
C2	4.84	3.170	0.473	0.237	0.655
C3	4.85	2.735	0.583	0.340	0.513

3.1.2 Dimension "Pedagogical approaches"

With regard to the measurement of the "Pedagogical approaches" component, the results showed that the KMO index is 0.821, which qualifies as excellent. This index shows us that the correlations between the items of the dimension are of good quality.

Table 7: KMO Index and Bartlett's test of the dimension "Pedagogical approaches

Kaiser-Mey quality mea	er-Olkin suring.	ir	ndex	for	sampling	0.821
Doutlott's	Test	of	Chi-	Two a	pprox.	1066.793
Subariaity	Test	01	Ddl			45
sphericity			Mean	ning		0.000

The results of the exploratory analysis (Table 8) uncover two (02) factors according to the Kaiser's rule (1958), which leads to the selection of the number of factors whose eigenvalue is greater than or equal to 1. Indeed, the first factor has an eigenvalue of 5.778 and represents 57.784 of the variance total and the second factor has an eigenvalue of 1.314 and explains 13.139% of the variance.

Table 8: Total v	ariance explained for	or the dimension
"Pedagogical a	pproaches" of the tr	aining variable

	Compo	1	2	
Initial	Figan	Total	5.778	1.314
Initial	Eigen	% of Variance	57.784	13.14
values		% Cumulated	57.784	70.92
Sums	extracted	Total	5.778	
from	the load	% of Variance	57.784	
square		% Cumulated	57.784	

With regard to the component matrix (Table 9), it demonstrates that the values of the 10 items representing the "Pedagogical approaches" dimension are between 0.596 and 0.869, which gives them a so-called acceptable significance.

	Compo nent 1	
AP1	Systems thinking and complexity management.	0.770
AP2	Critical thinking.	0.740
AP3	Anticipatory thinking.	0.596
APC1	The course draws on contextual knowledge about the emergence of SD and its main challenges.	0.768
APC2	The course provides an opening to other disciplines (adopting a global and integrating vision and common project).	0.754
APC3	The course enables action to be taken.	0.769
APC4	The course makes use of Study Skills.	0.771
APC5	The course uses Life Skills.	0.824
APC6	The course uses Civic Skills.	0.869
APC7	The course uses Professional Skills.	0.710

Table 9: Component matrix of the "Pedagogical approaches" dimension of the training variable

In addition, the Cronbach's alpha value for the dimension "Pedagogical approaches" is 0.915, which is excellent. Thus, the internal consistency is strong. In fact, the items measure the pedagogical approaches well and in a consistent manner.

3.1.3 Dimension "Teaching methods"

The KMO index for the dimension of teaching methods is 0.771 which is > 0.5. Therefore, the data for this dimension is factorable. The Bartlett's test of sphericity is significant since its value is < 0.005. The Chi-square is presented with 2 285.915 and the ddl with 231, which shows the existence of a good relationship between the different items that constitute this dimension as a whole.

Table 10: KMO index and Bartlett's test for the dimension "Teaching methods"

Kaiser-Meyer-Olkin Index fo measurement.	0.771	
	Chi-two approx.	2285.915
1Bartlett's test of sphericity	Ddl	231
	Signification	0.000

We must then choose the number of factors to extract. To do this, we analyze the table of the total variance explained. In the second column of Table 11, we notice that the 5 factors have an eigenvalue > 1, which we retain in full. The first factor alone explains 43.589% of the total variance of the 22 variables in the analysis, which we will retain, because it explains the said variance.

Table 11:	Total	variance	explained	for the	dimension
		"Teachir	ng method	s"	

Comn	Initia	al Eigen v	values	Sums extracted from the load square		
onent	Total	% of Varian	% Cumul	Total	% of Varian	% Cumul
		ce	ated		ce	ated
1	8.718	43.589	43.589	8.718	43.589	43.589
2	2.184	10.918	54.506	2.184		
3	1.384	6.921	61.427	1.384		
4	1.239	6.194	67.621	1.239		
5	1.045	5.223	72.843	1.045		

We can see from Table 12 that the values of the 22 items of the dimension "teaching methods" are between 0.430 and 0.832, which gives them significance. The values of the 22 items in the "teaching methods" dimension are between 0.430 and 0.832, which gives them an acceptable significance.

Table 12: Matrix of components of the "Teaching
methods" dimension"

	Items	Compo
		nent 1
TA1	Learning to know (knowledge).	0.560
TA2	Learning to do (know-how).	0.743
TA3	Learning to be.	0.742
TA4	Learning to live together.	0.557
TA5	Learning to become, learning to transform oneself and society.	0.662
AC1	The course has a social aspect.	0.532
AC2	The course has an economic aspect.	0.474
AC3	The course uses training content tailored to environmental protection requirements.	0.635
DV1	Solidarity (present and future generations).	0.762
DV2	Responsibility.	0.840
DV3	Respect and tolerance.	0.754
DV4	Commitment.	0.821
RE1	Enables students to acquire practical scientific knowledge in an objective manner.	0.650
RE2	Develops in students a commitment to act for the society's and the environment well-being.	0.742
RE3	Enables students to debate societal uncertainties and controversies.	0.726
SE1	Organised debates.	0.638
SE2	Problem situations.	0.461
SE3	Brainstorming session.	0.706
SE4	Case study method.	0.530
SE5	Lecture.	0.462

Furthermore, the value of the Cronbach's alpha index of the dimension "Teaching methods" is 0.928, which is excellent."

3.1.4 Dimension "Teaching activities"

The dimension "educational activities", which is composed of elements related to training programmes oriented towards SD and green jobs, is declared by the results of the following indices: The KMO index is 0.758 which is > 0.5, the Bartlett's test of sphericity is significant since its value is < 0.005(Table 13).

The Chi-square is presented with 224.0914 and the ddl by 10 this fact which shows the existence of a good relationship between the different items that constitute globally this dimension.

Table 13: KMO index and Bartlett test for the dimension "Teaching activities"

	reaching activities	
Kaiser-Meyer-Ol	0.758	
samp	0.758	
Doutlett's Test of	Chi-Two approx.	224.094
Sphericity	Ddl	10
Sphericity	Meaning	0.000

The results of the matrix of initial eigenvalues of the dimension "Teaching activities" show us that only the first component has a value greater than 1, this factor alone represents 54.953% of the total variance.

Thus, the values of the 5 items of the dimension "Teaching activities" are between 0.537 and 0.842, which give them an acceptable significance (Table 14).

Table 14 Matrix of components of the dimension "Teaching activities"

	Ites	Compo nent 1
AE1	Your institution has sustainability- oriented courses	0.842
AE2	Your institution develops orientation programmes on sustainability (new courses, new modules, seminar courses)	0.838
AE3	Environmental and sustainability activities should be initiated by the students themselves; independently of the departments, (lecturers, management)	0.537
AE4	All students receive training on sustainability issues	0.588
AE5	Your institution develops training programmes geared towards green jobs	0.838

The value of Cronbach's Alpha is satisfactory at 0.783 (Table 15).

Table 15: Reliability statistics

Cronbach's	Cronbach's Alpha based	Number of
Alpha	on standardized items	elements
0.783	0.783	5

When analyzing the table of item total statistics, we notice that if we eliminate item AE3, the Cronbach's alpha value index improves and is displayed as 0.800 (Table 16).

Table 16: Item total statistics

	AE1	AE2	AE3	AE4	AE5
Scale average when an item is deleted	9.99	10.04	10.06	9.39	9.84
Variance of the scale when an element is deleted	8.53	8.953	10.72	9.756	8.594
Full correlation of corrected items	0.677	0.677	0.363	0.413	0.696
Square of the multiple correlations	0.55	0.564	0.179	0.259	0.518
Cronbach's Alpha when the item is deleted	0.7	0.704	0.8	0.794	0.695

Thus the dimension "Teaching activities" is composed of the following items: AE1, AE2, AE3 and AE5. Following the parameters relating to training, we have deployed the same indexes in order to measure SD practices, which we present in the approach below:

3.2 Sustainable development practices

We have measured the adequacy of the sampling which shows that the KMO index is 0,651 (Table 17). It is qualified as acceptable. This index reveals that the correlations between the items of this variable are of good quality.

Table 17: KMO index and Bartlett's test for the var	iable
"SD practices"	

SE placified				
Kaiser-Meyer-Olkin inde quality measur	0.682			
Bartlett's Test of Sphericity	Chi-two approx	238.830		
	Ddl	45		
	Meaning	0.000		

Table 18 shows that the first three factors have higher total values than the rest of the components of this variable. The first component accounts for 36.973% of the total variance of the analysis, the second for 15.231% and the third for 10.647%.

Com	ponent	1	2	3
	Total		1.523	1.065
Initial Eigen	%of variance	36.973	15.23	10.65
values	% Cumulated	36.973	52.2	62.85
Sums	Total	3.697	1.523	1.065
extracted from the	% of variance	36.973	15.23	10.65
load square	% Cumulated	36.973	52.2	62.85

Table 18: Total explained variance of the variable "SD practices"

In order to choose the number of factors to be extracted, the graph of the eigenvalues, where the break of the Cattell's bend is located, reveals an abrupt change after the 1st facto. Hence, we retain this last one for the analysis, since it is more rigorous than that of the eigenvalues. Table 19 reveals that only 8 items have values between 0.484 and 0.842, which gives them acceptable significance. The value of Cronbach's alpha index is 0.820, close to 1. Hence, we can state that all the elements of the SD practices are homogeneous.

Table 19: Matrix of components of the "Sustainable development practices "variable"

	Items	Component 1
IDD2	To employability requirements (ease of job market integration of university graduates)	0.609
IDD3	To the requirements of the economic activity (establishment of multinationals at regional level)	0.622
ADD1	amp community commitment by your institution, including faculty, to sustainable development practices and promotion	0.756
ADD2	A community commitment from your institution including the administration to sustainable development practices and promotion	0.728
ADD3	Community commitment of your institution, including students, in sustainable development practices and promotion	0.843
ADD4	Prise en compte de la planification des actions envers le DD (ex. Consideration of SD action planning (e.g. celebration of environment days, SD week, meeting with	0.612

	Items	Component 1
	professionals, experts, quality of life	
ADD5	The existence of a steering group (SD committee or cell) at your institution's level	0.619
ADD6	Your institution has a student association or club with an SD vocation	0.484

4 Hypotheses validation

Once our results analyzed, we proceed to the validation of our study theoretical model hypotheses which we recall below:

H1: The curriculum has a significant effect on SD practices.

H2: Pedagogical approaches have a significant effect on SD practices.

H3: The more diversified the pedagogical methods are, the more they impact sustainable development practices.

H4: Teaching activities have a direct impact on SD practices.

Consequently, our conceptual model that has to be tested is presented as follows.



Fig. 3: Training with 4 dimensions

The results of the ANOVA analysis are reported as follows. According to table 20 below, we have a single model and the correlation coefficient between the explanatory variables and the variable to be explained Y = 0.637; the R square is 0.405. This model explains 40. 5% of the variance in sustainable development practices.

|--|

Model	R	R- Two	R-Two adjusted	Standard error of the estimation
1	0.636	0.404	0.385	0.54229

Furthermore, by proceeding with the ANOVA analysis of variance (Table 21), we find that the significance of the model tested is less than 0.05 since its value is equal to 0.000. Consequently, we declare that there is no link between the variables to be rejected and we judge the model as good overall.

Model 1	Sum of squares	ddl	Mediu m square	F	Sig.
Regression	25.712	4	6.428	21.859	0.000
Residue	37.936	129	0.294		
Total	63.648	133			

Table 21: Summary of ANOVA models

With regard to the coefficients' table, we remark the significance of the different variables (curriculum, pedagogical approaches and pedagogical methods) except for the teaching activity which presents a value of 0.280 above the 0.05 threshold (Table 22). Dealing with collinearity, the values of the tolerance of the different variables are higher than the threshold 0.3, in the same way for the VIF, the value of the different variables are lower than 4. Thus, the regression equation is expressed as follows:

Y=0.835+0.318*Cu +0.431*PA+-0.308*PM+0.072* TA (2)

With :

Cu=Curriculum, PA=Pedagogical approaches, PM=Pedagogical methods and TA=Teaching activities

Table 22: Coefficients table

Model 1	Stand ardize d coeffic ients			Co-linearity statistics	
	В	Т	Sig	Tolera nce	VIF
Constant	0.835	4.076	0.000		
Curriculum	0.318	4.439	0.000	0.665	1.504
Pedagogical approaches	0.431	4.883	0.000	0.534	1.873
Pedagogical Methods	-0.308	-2.783	0.006	0.546	1.830
Teaching Activities	0.072	1.084	0.280	0.757	1.321

Following the results announced above, we specify that the teaching activities (significance=0.280) will not be included in the explanation of sustainable development practices, which forces us to recalculate the regression of these. Table 23 presents the results of the coefficients of the different variables and their significance.

Table 23: Coefficients results

Model 1	Non- standa rdized coeffic ients			Co-linearity statistics	
	В	Т	Sig.	Tolera nce	VIF
Constant	0.904	4.633	0.000		
Curriculum	0.331	4.689	0.000	0.685	1.461

Pedagogical approaches	0.427	4.845	0.000	0.534	1.871
Pedagogical Methods	-0.265	-2.564	0.011	0.624	1.602

The new regression equation is displayed in this manner:

$$Y=0.904+0.331*$$
 Cu+0.427* TA+ -0.265* TM (3)

With: Cu=Curriculum, TA=Teaching approaches and TM=Teaching methods

Ultimately, the new conceptual model is presented in the figure below:



Fig. 4: Training with 3 dimensions

5 Conclusion

The aim of this article is to evaluate the impact of training on SD practices at the ITUK (Morocco). Consequently, and according the different results discussed above, the SD integration level in training varies considerably from one university teacher to another and from one institution to another.

We have confirmation of hypothesis 2, which stipulates that pedagogical approaches operate significant effects on SD practices, which is in line with the Higher Education Strategic Vision 2015-2030 Reform. In this respect, the Higher Council of Education and Scientific Research recommends "The diversification and appropriate choice of these approaches, both at the level of the initial training of educational actors and at the level of teaching, learning and training practices and situations"[2]. These pedagogical approaches are organically linked to the implementation of curricula, programs and training.

Equally, the pedagogical approaches constitute the reference framework underlying the management of teaching acts and learning steering. Therefore, we notice the considerable weight of pedagogical approaches (0.427), which are more important than that of the curriculum and teaching methods. In fact, the informed university teachers are solicited to work more on pedagogical approaches if they wish to succeed in their teaching actions, mission and involvement within this educational locomotive frame. Indeed, many researches conducted by the scientists emphasize the fact that education plays a crucial role at the level of social and individual prosperity [27].

In this regard, the guidelines of the Higher Education Strategic Vision 2015-2030 Reform give a lot of importance to these approaches, as well as their diversification, both at the level of initial training of educational actors, and at the level of practices and situations of teaching, learning and training. Also, the pedagogical approach allows itself to promote the knowledge self-construction, by opening up to interactive methods that encourage students to take the initiative and engage themselves in scientific and practical activities.

Accordingly, the University is invited to develop a reference framework relating to pedagogical approaches that would govern teaching practices with the aim of achieving the objectives of SD in a collective manner [18] as these approaches, when mobilized in teaching, are the development of students' skills, such as objective-based teaching, learning-by-doing and pedagogy by objectives, project pedagogy or discovery and problem-solving pedagogy.

In terms of the effects of training on SD practices, this study will enable higher education actors to draw the necessary conclusions for the development of curricula, programs and training through approaches and methods that must remain in conformity with the major societal, social and environmental choices. A good pedagogical model promotes openness to innovations, knowledge, culture and universal values.

Higher education institutions must direct the construction of curricula by integrating pedagogical approaches. This can be achieved by offering more training to teachers who intervene as the sole actors in this learning action through their knowledge transmission, know-how and know-being.

In its new development model for 2035, the Moroccan university must operate with a deep modernization of its programs and pedagogical approaches [2]

The university curriculum must be irrigated by several approaches and must emphasize soft skills: Study Skills, Life Skills, Civic Skills and Professional Skill, in particular emphasizing projectbased learning, teamwork, critical thinking, etc.

The transition to digital technology through MOOCs as a pedagogical support for online training is a powerful lever for development, transformation and pedagogical innovation, which will allow for interactive, experiential and transformative learning that will only be beneficial for the acquisition of all the practices related to SD for the next generation [28].

In any case, the university has a moral duty to work toward a SD society for present and future generations, as it is the fundamental core where the different tomorrow's leaders skills are forged. Each higher education institution should have a crystalclear vision to ensure a contribution to a sustainable society through the training it provides (curricula, teaching approaches and methods applied

6 References

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