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A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

BEHAVIORAL ANALYSIS OF ADOLESCENT'S STUDENTS ADDICTED TO FACEBOOK AND ITS IMPACT ON PERFORMANCE AND MENTAL HEALTH

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SUMMARY

Background: The massive use of social media, especially Facebook, has an impact on student's neurocognitive performance and mental health in Morocco. The purpose of this study is to show the impact of the Facebook addiction, especially with Smartphone on school performance and mental health.

Material/ Methods: On the methodological part a questionnaire was used beside the Bergan Facebook Addiction Scale Test (BFAS) which has been validated in the Arab version with Cronbach's Alpha (α = 0.788), and the Nomophobia Questionnaire (NMP-Q) Arabic version, with a general anxiety test, which are distributed to 541 participants in the middle and the high schools of Kenitra city 55.1% of girls and 44.9% of boys have a mean age of 15.238 years, SD = ± 0.06.

Results: The results obtained confirmed by a negative correlation in relationship with the first semester general score and Facebook addiction by the BFAS test, and a significant relationship between the increase in Facebook addiction in parallel with the state of anxiety (P <.001) and Nomophobia (P <.000).

Conclusions: We have been able to pick up the negative impact of the social media exposure on the performance and mental health of adolescent students. in order to have a solution from this plague in the future.

Key words: Social media, Facebook addiction, teenagers, Nomophobia, Anxiety.

INTRODUCTION

Social media have become something essential in our daily lives, they have spread through the web sites and the new generations of „smartphones" and tablets. These tools have greatly facilitated the access to social media, especially through the smartphone that has become the most used tool because of the easily used and mobility and other factors: (44% of the Moroccan population, 16 million mobile social media users in 2019), (1) (We are Social & Hootsuite, 2019), web. In this article we chose the Facebook platform because of its massive used in Moroccan society: (17 million Moroccan TOTAL NUMBER OF MONTHLY ACTIVE FACEBOOK USERS), (We are Social & Hootsuite, 2019), and also because it is considered as the most used platform in this virtual world (2.271 Million on MONTHLY ACTIVE USERS ACCOUNTS). The main development of the Facebook platform starts with the Arab Spring action due to the use of the media by the revolutionaries in order to gathering people and ideas (Farhan & Varghese, 2018). It was considered the only reliable communication solution between young people to program manifestations and also exchange and express ideas between them especially in the case of suspension of the usual telecommunication networks, and after that it becomes a tool for sharing experiences and chatting. Another evolution will be mentioned due to a commercial orientation away from the policy, based mainly on the number of views and the sharing of videos and hach taguent, and it is also with the WikiLeaks case that will appear other uses based on the marketing of databases and the specificity of the daily life of users for legal or non-legal purposes. From this motivation of information exchange and changing of the socioeconomic realities in certain countries like Morocco, some dependency has settled on the use of these technological means and especially the social media among them Facebook. More and more, a relationship becomes a necessity and sometimes an addiction that is linked to withdrawal symptoms as well as sleep disturbances and disruptions in social and family relationships. The problem of the social media addiction will affect everyone in society and especially young people and adolescents whom will be more and more disturbed in their developments and also their academic performance. In this context, our study aims to assess the social media addiction degree especially the Facebook and its connection with their anxiety and Nomophobia degree, Moroccan high school and college young in Kenitra need a great parents attention on the state of this new addiction that can cost us the physical and mental health of our Moroccan youth. Frstly, we will try to spread the results of our research that used psychometric tests and a questionnaire to found the links between several parameters and the degree of addiction found among young Moroccans.

MATERIAL AND METHOD

Participants

We have selected a teenage target consisting of a sample of 541 Moroccan middle and high school students from KENITRA city, including 298 girls and 243

Table 1. Socio-demographic questionnaire

Variable	N	%
Gender		
Men	243	44.9%
Women	298	55.1%
Age		
12-14	188	35%
15-16	234	43%
17-19	119	22%
School levels or Grades		
Grade7 (Cycle collégial)	53	10%
Grade8 (Cycle collégial)	76	14%
Grade9 (Cycle collégial)	208	38%
the common core Grade10 (Cycle qualificant)	112	21%
1st year Bac Grade11 (Cycle qualificant)	42	8%
2nd year Bac Grade12 (Cycle qualificant)	51	9%
the first tools used to connect		
Smartphone	469	86.7%
Pc	72	13.3%
Activity		
Sport	336	62%
Art	115	21%
Other	21	4%
Any	69	13%
Purpose of use Facebook		
not used	24	4%
Communication (chat)	149	28%
news	115	21%
Communication and news	215	40%
Other	38	7%

boys, who are randomly selected through the Kenitra's Regional Directorate of Education and training who gave us the authorization to carry out this study within the colleges and high schools in the city from 04/04/2017 to 28/04/2017.

In table 1 we present the results of a socio-demographic questionnaire of the examined group.

Instruments

We have included all grade levels in this study, students were supposed to complete a questionnaire and answer psychic tests, this was in class and everyone participates at the same time; before the handover a clear and precise explanation of each part of the questionnaire and test was devoted to the students and even answers to their questions were welcome; to ensure accurate collection of information and all this was done with the help of teachers and the presence of directors and / or supervisors.

The questionnaire

A general questionnaire set up by the research team to detect variables related to 3 axes, the first axis is linked to socio-demographic data (Sex, Age, Nationality, Civil and family situation, Parents), the second relates to social media (the most used material to connect and the duration of use of social networks,

preferable application) and finally the last is related to education (the general average of semesters preceding, the way to prepare homework and exams)

Bergen Facebook addiction Scale test (BFAS):

The Facebook addiction test was developed and validated by (Andreassen et al, 2012), it was translated into Arabic to facilitate the students' understanding of the test. This test consists of 6 items on a scale rated from 1 to 5: from very rarely: 1 to very often: 5. The six items reflect the characteristics of the addiction (ie, saliency, modification of the mood, tolerance, withdrawal, conflict and relapse) (Griffiths, 2005). The scores vary between 6 and 30 points, and who considered a Facebook addictive are those who answer by degree 3 or more on at least four items on the six items.

Anxiety Test: Questionnaire About General Trouble Anxiety (GAD-7) :

The anxiety test is called QUESTIONNAIRE ON GENERALIZED ANXIETY DISORDER (GAD-7) was developed and validated by (Spitzer, Kroenke, Williams & Löwe, 2006) (5) , (Spitzer L, Williams JB, Kroenke K et al 2014), it was also translated into Arabic to facilitate the participants' understanding of the items. This test consists of 7 items on a LIKERT scale of 0 to 3 with a score of 0 which means (Never), 1 means (several days), 2 means (more than half of the days), and 3 means (almost every day) and each item is in the form of an answer to a suggested question at the beginning of the test: „In the last 14 days, how often have you been disturbed by the following problems? (Use a „ " to indicate your answer.) The scores vary between 0 and 21 and according to this score we find for four scores ranging from a state of anxiety to Low, Light, Moderate, Severe.

Nomophobia Test (NMP-Q):

It is a questionnaire form called NMP-Q (No-Mobile Phone-Phobia-Questionnaire), it was developed and validated by Yildirim and Correia, (2015), was to Arabic to facilitate its comprehension for students. According to our penance published by Louragli et al, (2018), with an alpha coefficient of Cronbach = 0. 88. This questionnaire consists of 20 items with a LIKERT scale of 1 to 7: 1 means (totally disagree) and 2 to 7, means the degree of (totally agree) For the first 9 items we find proposals concerning situations with the presence of the Smartphone and from item 10 to the end (the items20) we find proposals that concern situations without the presence of Smartphone. The NMP-Q is divided into 4 dimensions is that give 4 states of nomophobia: absent, light, moderate or severe depending on the score calculated, which varies between 20 and 140.

Data Analysis

The test and questionnaire which were filled, have been designed in the form an excel chart before sending a software (statistics for social sciences) SPSS 25 to carry out a test analysis and a test statistics (Correlation, Cronbach alpha).

RESULTS

There was no statistically significant difference between the results obtained by men and women, therefore further analysis will be conducted without taking into account gender. In table 2 we present statistical descriptive of the questionnaire set up by the research team.

Table 4 present the correlation between the score and elements of the Bergan Facebook Addiction Scale (BFAS) and some variables of the sociodemographic questionnaire. We have a Cronbach's Alpha coefficient of 0.788, which is a validation of the Bergan Facebook Addiction Scale test (BFAS). The BFAS Arabic version (see the appendix)

We have obtained a highly significant correlation of the 6 questions and the score of Facebook Scale addiction test with all variables except for Age which is not significant with the questions Q1; Q2; Q3 and Q5 (Q1, r = .027, p > .05); (Q2, r = .067, p > .05); (Q3, r = .046, p > .05); (Q5, r = .073, p> .05) and also with the number of hours spent on the camputer we found and among the variables that are significant. We found only for the first semester score a negative correlation with the score total and all AFBS test questions (Q1, r = -0.183 **, p < .01); (Q2, r = -.153 **, p <.01); (Q3, r = -.218 **, p <.01); (Q4, r = -.099 *, p < .05); (Q5, r = - .185 **, p < .01); (Q6, r = - .225 **, p < .01); (Total score, r = -.246**, p < .01).

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Table 2. Statistical descriptive of the questionnaire

Statistical descriptive			
	N	**Mean**	**SD**
Age	541	15.23	0.06
hours spent per day on:			
- smartphone	541	4.00	0.13
- PC	541	0.93	0.07
-Net	541	3.13	0.14
-Facebook	541	2.72	0.10
-Whatsapp	541	1.72	0.09
-twitter	541	0.07	0.012
-instagrame	541	0.86	0.06
The overall grade for the first semester	541	12.43	0.11

Table 3. Validation of the Bergan Facebook Addiction Scale (ADFS) in the Arabi language

Statistics elements					
	Mean scale When removing an item	Variance of scale when deleting an element	Full correlation of corrected items	Square of multiple correlation	Cronbach's Alpha when deleting the item
Item1	11.43	26.313	.596	.389	.743
Item2	11.13	25.422	.609	.400	.739
Item3	11.13	26.204	.501	.266	.766
Item4	11.51	27.336	.485	.244	.769
Item5	11.79	27.181	.555	.310	.753
Item6	11.53	26.424	.500	.264	.766

Table 4. Correlation between the score and elements of the Bergan Facebook Addiction Scale (BFAS) and some variables of the sociodemographic questionnaire

	N		BFAS	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Age	541	Correlation Coefficient	.095*	.027	.067	.046	.104*	.073	.133**
		Sig. (bilateral)	.028	.526	.122	.288	.015	.090	.002
Smartphone	541	Correlation Coefficient	.329**	.193**	.228**	.268**	.241**	.213**	.263**
		Sig. (bilateral)	.000	.000	.000	.000	.000	.000	.000
Laptop	541	Correlation Coefficient	.114**	.171**	.081	.004	.060	.097*	.060
		Sig. (bilateral)	.008	.000	.060	.928	.167	.024	.164
Net	541	Correlation Coefficient	.228**	.206**	.210**	.084*	.203**	.127**	.207**
		Sig. (bilateral)	.000	.000	.000	.050	.000	.003	.000
Facebook	541	Correlation Coefficient	.607**	.491**	.497**	.407**	.376**	.441**	.429**
		Sig. (bilateral)	.000	.000	.000	.000	.000	.000	.000
General grade of the first semester	541	Correlation Coefficient	-.246**	-.183**	-.153**	-.218**	-.099*	-.185**	-.225**
		Sig. (bilateral)	.000	.000	.000	.000	.021	.000	.000
Anxiety	541	Correlation Coefficient	.244**	.125**	.122**	.263**	.146**	.184**	.165**
		Sig. (bilateral)	.000	.004	.004	.000	.001	.000	.000
Nomophobia Score	541	Correlation Coefficient	.499**	.350**	.325**	.367**	.312**	.352**	.306**
		Sig. (bilateral)	.000	.000	.000	.000	.000	.000	.000

(Q2, r = .067, p > .05); (Q3, r = .046, p > .05); (Q5, r = .073, p> .05) and also with the number of hours spent on the camputer we found and among the variables that are significant. We found only for the first semester score a negative correlation with the score total and all AFBS test questions (Q1, r = -0.183 **, p < .01); (Q2, r = -.153 **, p <.01); (Q3, r = -.218 **, p <.01); (Q4, r = -.099 *, p < .05); (Q5, r = - .185 **, p < .01); (Q6, r = - .225 **, p < .01); (Total score, r = -.246**, p < .01).

In Fig. 1. We presented the relation between Facebook Addiction Scale and the type of Nomophobia.

Moreover a chi-square test was run between Facebook Addiction scale and the type of Nomophobia that gives a relationship between these two variables $\chi^2 = 117.900a$, P < .000.

In Fig. 2. We presented the relation between Facebook Addiction Scale and Type of Anxiety.

Moreover a chi-square test between Facebook Addiction scale and the type of Anxiety that gives a relationship between these two variables $\chi^2 = 26.855a$, P < .001.

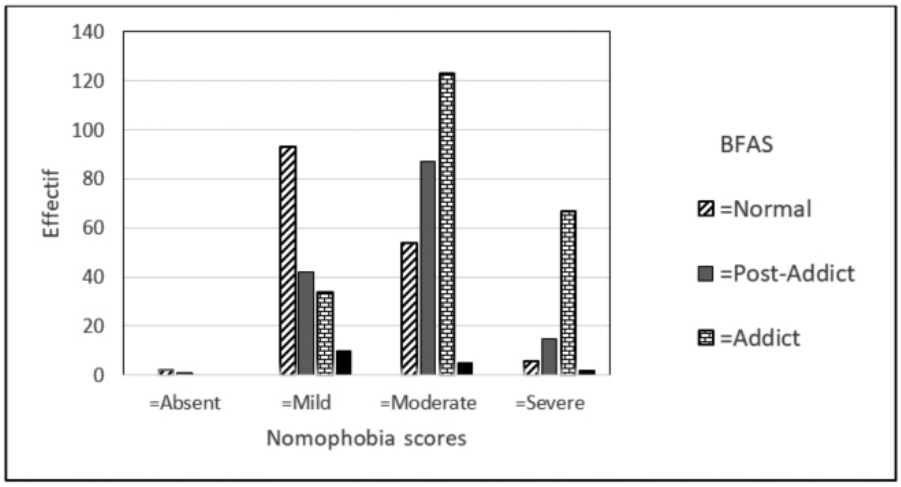

Fig. 1. Relation between Facebook Addiction Scale and the type of Nomophobia

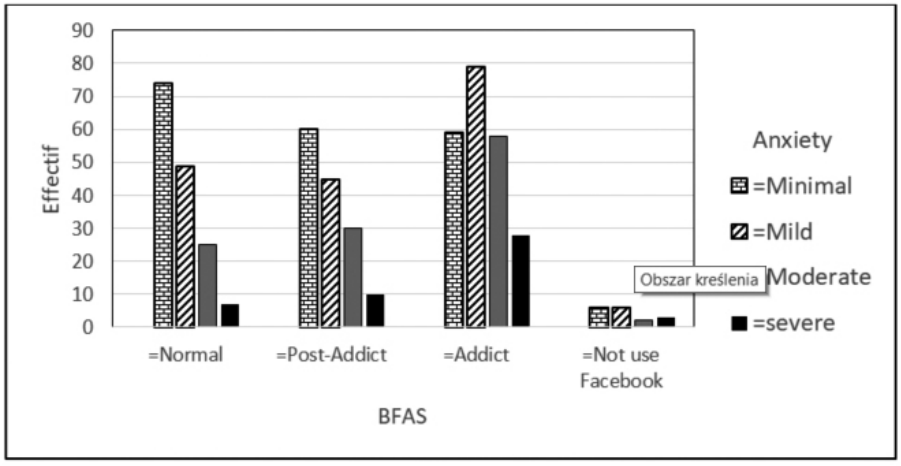

Fig. 2. Relation between Facebook Addiction Scale and Type of Anxiety

In Fig. 3. We presented the relation between Nomophobia (NM-Q) and type of Anxiety.

Moreover a chi-square test was performed between Nomophobia and the type of Anxiety which gives a relationship between these two variables $\chi^2 = 32.910a$, $P < .000$.

In fig. 4. We presented the relation between Facebook Addiction scale and the 1st application use once you have connected to the internet network.

We performed a chi-square test between Facebook Addiction scale with the first application use once you have connected to the Internet and that gives a relationship between these two variables $\chi^2 = 69.905a$, $P < .000$.

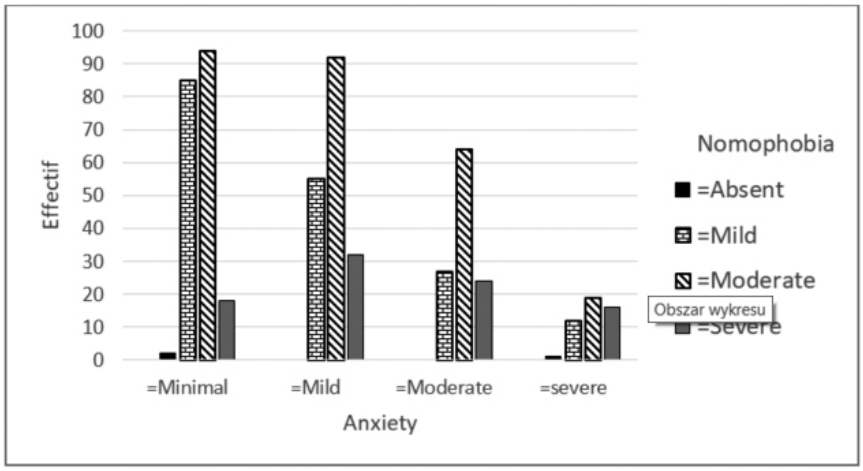

Fig. 3. Relation between Nomophobia (NM-Q) and type of Anxiety

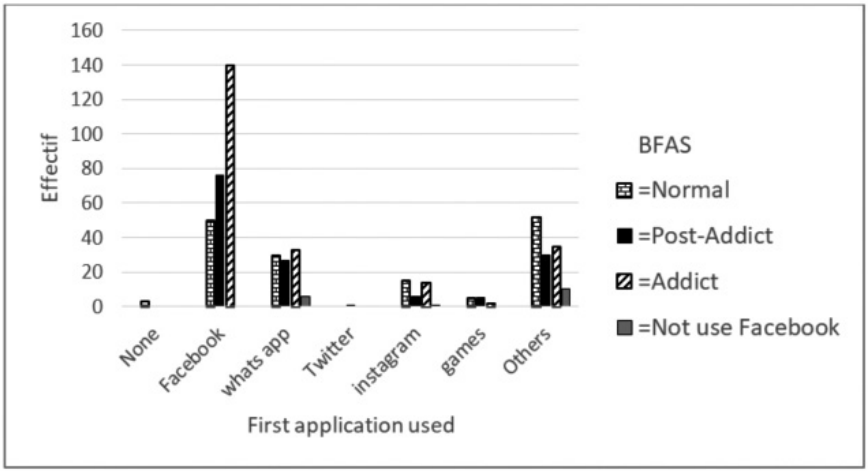

Fig. 4. Relation between Facebook Addiction scale and the 1st application use once you have connected to the internet network

DISCUSSION

Our daily challenge is to evaluate for smartphones and their applications, these products reach the adults and the kids and the category of teenagers remains the most touched and the most targeted.1

We chose to evaluate the impact of the teenagers' use of the Facebook application on their academic performance and also on their mental health parameters. Indeed, we studied the influence of the Facebook addiction via Smartphones on the state of anxiety and Nomophobia in Kenitra's high school students focusing on their first semester academic results. Facebook addiction influences school performance and adolescent mental health status

We validated the BFAS translated from English to Arabic with a cranbach alpha of 0, 788

And according to a study by Da Veiga et al. (2018). The BFAS translated from English to Portuguese had a Cronbach global alpha coefficient of 0.87 and there is also a negative correlation with the overall score of the first semester and the 6 items of BFAS which implies more the addiction was high plus the score and decreases Score of BFAS (r = -, 246 **, p <.01); Item1 (r = -, 183 **, p <.01); Item2 (r = -, 153 **, p <.01); Item3 (r = -, 218 **, p <.01); Item 4 (r = -, 099 **, p <.05); Item 5 (r = -, 185 **, p <.01); Item 6 (r = -, 225 **, p <.01). And in another study by Shihui et al. (2019), aims to explore the effects of using the Internet and Facebook on the deconcentrating of students, they found that the excessive use of Facebook and the Internet for entertainment purposes had a negative influence on students' academic achievements

And among the factors that are linked with the Facebook addiction is the massive used of smartphones to connect to internet which is facilitated the Facebook access in an easy way which also implies a dependence on the smartphone which developed in Nomophobia and a very strong relationship was found between the degree of high addiction with a severe and moderate Nomophobia state from a chi-square test (P = .000 <.01)

The results we obtained show that the state of severe anxiety is linked with a high Facebook addiction with (P = .000 <.01) and a study conducted at 526 students, to assess the relationship between use of Facebook and Facebook addiction and anxiety shows that People with an increased reliance on Facebook reported increased anxiety from the state without Facebook Xie and Karan (2019). And we found that the Smartphone as a tool easy for access to social media which subsequently became addictive has an effect on mental health and has been confirmed by the significant relationship (P = .000 <.01) between the degree of high Nomophobia in adolescents with mild and moderate anxiety. Another study shows that there is a relationship between smartphone addiction with anxiety and depression Ithnain et al. (2018).

These results might be interpreted in acordance to the microgenetic theory of symptom formation (Brown, Pachalska 2003; Brown, 2015; Pąchalska, MacQueen, Cielebąk 2018). The primacy of affect, that is for example anxiety, in relation to the media, are related to the brain function and the creation of new pattern of neural networks.

Is in the cortex that perception and action reach the level of conscious decision. The brain forms articulated pictures or representations of what is out there in the world, and of what has been out there in the world, and the play of these images constitutes conscious perception. What is more – and this has only recently begun to be a subject of interest for neuropsychology (Pachalska, MacQueen, Cielebąk 2018) – the cortex is capable of forming pictures and/or images (cf. Fig. 5) of what might be or could be out there, or could have been, or should have been, and was not.

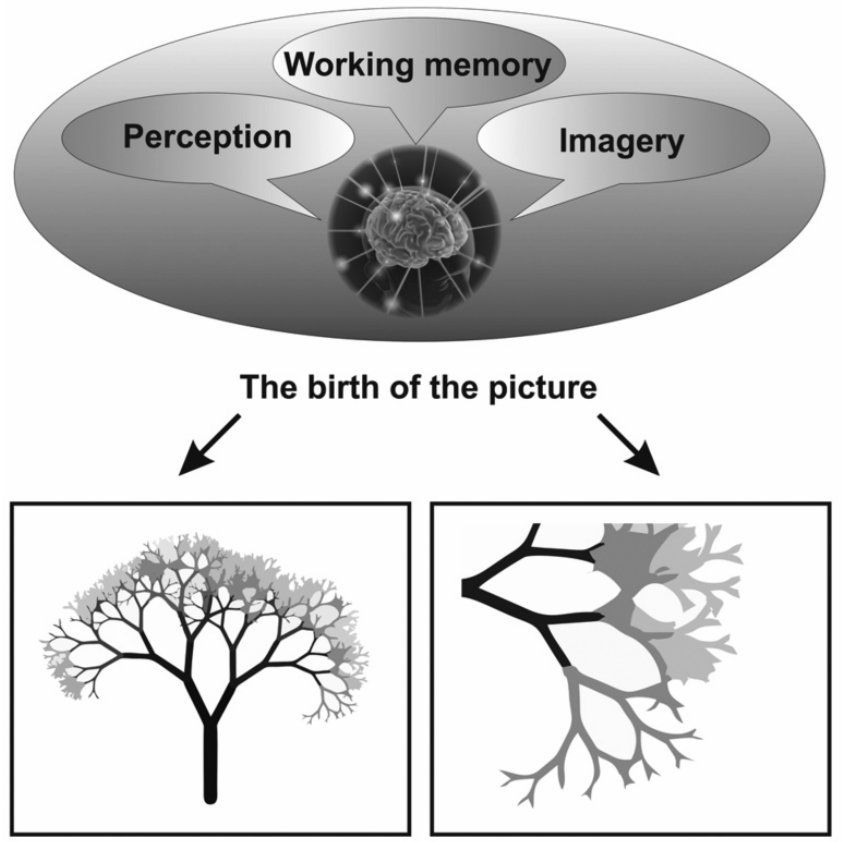

Fig. 5. The direction of brain and organism evolution, in full exteriorization, detachment and modulation of the process of perception
Source: Pachalska, MacQueen, Cielebąk (2018), modified

It is not that hard to form a coherent theory of how the brain forms an image of something the eyes are seeing or have seen, but it is quite another thing to explain how the "mind's eye" works in terms of brain structure and function. The complexity of perception results from the fact that these three images come into existence independently and sequentially, though there is only one perceiver and one object, and the entire process takes milliseconds to complete. The conscious mind, then, typically experiences its perception as a single, simple act of seeing. According to microgenetic theory, however, this single act is a multi-layered actualization, the tip of an iceberg that floats to the surface and then subsides, containing within itself the traces of all that has gone before, in phylogeny, ontogeny, and microgeny (Pachalska et al 2012). It is worth remembering that neural network patterns are not only related to memory processes but are also linked to self-related processing (D'Argembeau et al., 2005;). This may explain the tendency to ruminate which is a characteristic of patients with mood disorders, as well as in the case of produing the partiular anxiety type and level (Marchetti et al., 2012).

It should be add, that the brain „speaks" in electrical and chemical language, so launching and constant stimulation with images presented in the media formatted individual connections triggers specific brain chemistry, strengthening habits thanks to the reward system, and at the same time strengthening anxiety through stimulation of the punishment system. As the world-renowned neuropsychologist Gazzaniga (2011) puts it, the fixation of specific connections in the brain is closely associated with experienced emotions, formed disease syndromes (including anxiety). It is also connected with our self, both minimal (working) and longitudinal (autobiographic). Therefore, it is not surprising that we have been able to pick up the negative impact of the massive uses of social media on health and academic performance among adolescents students.

The problem we are addressing in this paper is new and requires wider, global research in order to have a solution from this plague in the future.

CONCLUSIONS

The technological revolution in the telecommunication field has given us social media interposed between them thanks to the internet and which have become a virtual world where teenagers and adults can escape from the daily routine to express and exchange their ideas and feelings with different users of these networks of different nationalities.

In this research we shed light on the impact of social media addiction on the academic performance of the college and the high school students and we worked on Facebook because of its higher uses in Morocco than other social media and we validated the Bergan Facebook Addiction Scale test and we get as a result the influence of Facebook's addiction on the overall score of the first semester with a high state of anxiety among addictive students and in parallel a state of moderate Nomophobia and severe. We conclude that the massive uses of social media has adverse effects on health and academic performance among adolescents, and for that we will go into the future with this study to provide a remedy to this scourge.

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Appendix: Bergan Facebook Addiction Scale. (ADFS) version Arabe

بالنسبة لكل سؤال، ضع دائرة على الرقم الذي يتوافق مع إجابتك	نادرا جدا	نادرا	أحيانا	غالبا	في كثير من الأحيان
1-هل تقضي الكثير من الوقت في التفكير في الفيسبوك أو ما عليك القيام به في الفيسبوك	1	2	3	4	5
2- لديك الرغبة في استخدام الفيسبوك دائما بكثرة	1	2	3	4	5
3- تستخدم الفيس بوك لنسيان مشاكلك الشخصية	1	2	3	4	5
4- أنت حاولت التقليل من استخدامك للفيسبوك , دون نجاح	1	2	3	4	5
5- يمكنك أن تصبح قلقا ومهتاجا إذا لم تتمكن من استخدام الفيسبوك	1	2	3	4	5
6-أنت دائم التواجد على الفيسبوك بحيث أن هذا له تأثير سلبي على دراستك أوعملك	1	2	3	4	5