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Investigating the Impact of using Technology on Motivating Physical Activities

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Keywords: Physical Activities; Activity theory; Logistic regression; Smart devices; Technological tools.

Abstract: In this era, the era of the fourth industrial revolution, it is noticeable that technology is linked to the development of different fields, such as health, education, sports, and entertainment. This is clearly observed regarding the dissemination of devices and tools that measure vital signs such as heart rate, number of calories, and number of steps taken on a daily basis. This link is considered a paradigm shift for all age groups and has an impact on people who follow it. In this research, the objectives are to investigate the tendency to use smart devices (technology) to encourage working out and study the hypothesis that technology motivates people to practice physical activity (PA). The target category of this research is persons above 13 years. A questionnaire has been created based on the fourth generation of activity theory (AT). The questionnaire contains questions about five aspects of AT: motivations, barriers, level of awareness, community/environment and rules. These aspects could determine the effect of using persons the technology to practice PA. An electronic questionnaire has been sent through social media. 312 persons had participated in the questionnaire. Two methods are used to analyze the data. Descriptive statistics based on AT aspects and logistic regression to determine significant factors that technology motivates people to practice PA. The results of the study indicated an influence over the chance to do PA as a healthy aspect and claimed that technology motivates people to practice PA. The factors that affect significantly are determine objectives, Free, individual training, and no restrictions in place and time during using technology are significant factors. Awareness camping need to be conducted to motivate people to do PA as a health aspect even by using technology or other equipment. Creating more suitable smart devices that achieve people's objectives could motivate them to do PA as well.

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التحقق من تأثير استخدام التكنولوجيا في تحفيز الأنشطة البدنية

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الكلمات المفتاحية: الأنشطة البدنية؛ نظرية النشاط؛ الانحدار اللوجستي؛ الأجهزة الذكية؛ الأدوات التكنولوجية.

الملخص العربي: من الملاحظ في هذا العصر، عصر الثورة الصناعية الرابعة، أن التكنولوجيا ترتبط ارتباط وثيق بتطور المجالات المختلفة، مثل الصحة، والتعليم، والرياضة، والترفيه. ويلاحظ ذلك بشكل واضح فيما يتعلق بانتشار الأجهزة والأدوات التي تقيس العلامات الحيوية كمعدل ضربات القلب، وعدد السعرات الحرارية، وعدد الخطوات التي يتم اتخاذها بشكل يومي. ويعتبر هذا الرابط نقلة نوعية لجميع الفئات العمرية وله تأثير على الأشخاص الذين يتبعونه. تتمثل أهداف هذا البحث في دراسة الاتجاه لاستخدام الأجهزة الذكية (التكنولوجيا) للتشجيع على ممارسة التمارين الرياضية ودراسة الفرضية القائلة بأن التكنولوجيا تحفز الناس على ممارسة النشاط البدني. الفئة المستهدفة في هذا البحث هم الأشخاص فوق ١٣ سنة. تم إنشاء استبانة على أساس الجيل الرابع من نظرية النشاط. تحتوي الاستبانة على أسئلة حول خمسة جوانب لنظرية النشاط: الدوافع، والحواجز، ومستوى الوعي، والمجتمع/ البيئة، والقواعد. يمكن لهذه الجوانب أن تحدد تأثير استخدام الأشخاص للتكنولوجيا لممارسة الرياضة. تم إرسال الاستبانة الإلكترونية عبر وسائل التواصل الاجتماعي. وقد شارك ٣١٢ شخصا في الاستبانة. تم استخدام طريقتين لتحليل البيانات. إحصائيات وصفية تعتمد على جوانب نظرية النشاط والانحدار اللوجستي لتحديد العوامل التكنولوجية المهمة التي تحفز الأشخاص على ممارسة الرياضة. أشارت نتائج الدراسة إلى وجود تأثير على فرصة ممارسة النشاط البدني كجانب صحي، وأظهرت أن التكنولوجيا تحفز الناس على ممارسة النشاط البدني. ووجد أن العوامل التي تؤثر بشكل كبير في تحفيز ممارسة الرياضة هي تحديد الأهداف، ومجانية الجهاز أو التطبيق، والتدريب الفردي، وعدم وجود قيود في المكان والزمان أثناء ممارسة النشاط البدني. ووجد ضرورة إقامة حملات توعوية لتحفيز الأشخاص على القيام بالنشاط البدني كجانب صحي باستخدام التكنولوجيا أو المعدات الأخرى. وأخيراً يستنتج من هذه الورقة ان وجود واستخدام أجهزة ذكية يساعد في تحقيق أهداف الأشخاص ويحفزهم على القيام بالنشاط البدني.

1. Introduction

Health is the most important element of human life. Therefore, Sport as physical activity is important because of the positive impact it has on the individual. Today, technology devices are attached to our daily life activities; they are supportive tools to encourage increasing moving and playing sports. These tools and devices can measure vital signs such as heart rate, number of calories, and number of steps taken on a daily basis. This link is considered a paradigm shift for all age groups and has an impact on people who follow it, especially with the advancement of wearable technologies. Since the authors of this research are from multidisciplinary fields (Technology, Medicine, and statistics) it was of interest to investigate the Impact of using Technology on Motivating Physical Activities. It is noticeable that wearables bands, mobile sports applications, and videos in the sports industry have become salient products. This interest in E-sports has been expanded even to the research field. For example, some research focused on understanding the situation where users have interests and intentions to use smart-connected sports products using some theories such as the theory of planned behavior (TPB) [1]; other research highlighted how there is a growing market for applications that support at-home fitness, especially for older adults who are typically more isolated, less active, and less likely to train at a gym [2] Moreover, one of the research papers categorizes the interaction design in fitness applications into the console, desktop, and mobile. Furthermore, the applications can be unidirectional and bidirectional, as shown in Figure 1 [2].

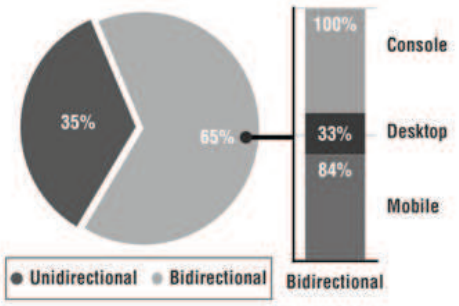

Figure 1: The interaction design in fitness applications [2]

Physical activity promotion contributes significantly to the global public health agenda, with initiatives addressing a wide range of disorders in a variety of demographics, contexts, and nations. Physical activity promoters have a lot of new ways to reach people because of technological advancements. Internet-based interventions have the ability to stimulate minor but meaningful increases in physical activity with little time and effort [1]. There is no doubt that science and technology may assist athletes in reaching better achievements "Faster, higher, stronger!". Science and technology can provide a considerable competitive advantage, which is precious in today's increasingly competitive and commercialized sport. The introduction of smartphones allows access to the Internet and applications (apps) while on the go. Moreover, commercial wearable devices for recording health and fitness-related activities may be the first mainstream implementation of dedicated wide-ranging convincing technology. Indeed, fitness trackers provide a tool for individuals wishing to improve their health to get motivation more easily by providing personal data-based insights.

The persuasive power of various monitoring devices on practices and behavior has been investigated and analyzed. In this regard, it has been found that visualization outcome combined with step target could considerably boost physical activity based [3] [4]. Wearable fitness tracking devices could change benefits and practices associated with these developing technologies across time, as reported by Fritz et al. [5]. They also may serve as a foundation for personal informatics technology design implications for long-term health and fitness support.

Other researchers discussed how fitness trackers and other self-efficacy mobile healthcare applications should be designed. For example, Asimakopoulos et al. [6] considered the particular components of fitness tracker user engagement and long-term motivation. The authors presented the results of a four-week location diary research and Healthcare Technology Self-efficacy (HTSE) questionnaire assessment of 34 users of two popular American fitness trackers: JawBone and FitBit. Other studies focused on numerous issues about the technology's usefulness in driving behavior change. Fitness technology frequently includes behavior change approaches such as goal planning, feedback, rewards, and social elements. The goal is to determine which components are the most effective and which are actually used by customers. In this regard, Sullivan, and Lachman [7] address various techniques for engaging inactive, vulnerable populations that are not normally included in fitness technology gadgets or applications. Action planning, reshaping negative attitudes, improving environmental conditions, and recognizing other impediments to regular physical activity are just a few of them. More recent, Rapp, and Tirabeni [8] conducted semi-structured interviews with amateur and elite athletes for this article to learn what they want from their trackers, how such devices can affect their "mind" by affecting motivation and attention during workouts and races, and how sports data is intertwined with other information about their lifestyle. The authors presented three themes that may be significant for Personal Informatics based on these findings include that Personal Informatics (PI) systems should start considering the physicality of the device, explore new modalities for supporting the user's contextual needs, and focus on reflection and goal support.

Furthermore, Khaghani et al. [2] looked at how technology can help people train at home, motivating them to start and maintain an active lifestyle while also assisting them in achieving benefits (such as improved strength and balance). The authors discovered and compared many types of home fitness apps and emerging classes of applications in the app stores (those with the highest number of downloads and active users). The results showed that the precise factors for encouraging a better degree of engagement and adherence to training programs include social persuasion mechanisms, a human coach (rather than no coach or a virtual coach), sensors that automatically detect activity (rather than manual data entry); and multimodal interaction with the user. On the other hand, Kos et al. [9] discussed the role of science and technology in sport. The goal of this work is to employ technology to speed motor learning. At the same time, it is undeniable that technology can exceed human senses in

virtually every aspect, including using science in the coaching domain. For example, a smart eCoach monitors an athlete's actions and provides recommendations based on all available data from the athlete's personal history as well as data from the "sport cloud." The authors discussed technology trends and challenges in sports, including the Internet of Things, smart sports equipment, and real-time biofeedback systems and apps.

The aim of this article is to investigate the tendency of using smart devices (technology) to motivate people to practice physical activity (PA). This article is organized as follows: Introduction as given in Section 1. Data collection is presented in Section 2. The methodology is discussed in Section 3. Section 4 contains the results of the research. Finally, discussion is given in Section 5, and conclusion and recommendation are presented in Section 6.

2. Data collection

An electronic questionnaire has been created based on the fourth generation of activity theory (AT). It has been sent through social media for a random sample. The collected responses are 312. All responses were involved in data analysis, i.e. no excluded responses. The questionnaire consists of 5 parts: Demographic data (gender, married status, age, education level, job and about practicing PA follows by five parts about the PA which matches the five aspects of AT. Information about PA (places, objectives and, uses of technology devices), information about technologies devices or other equipment that used, motivations of practicing PA by using technology. Finally, barrier of using technology.

3. Methodology

3.1 Theoretical framework

Activity theory (AT) is used as a framework for analyzing human behavior. It has been used in multidisciplinary research and in the sports research field as well [10]. In fact, AT has become an increasingly popular lens through which to research workplace settings [11]. AT has been derived from the work of the Soviet educational psychologists Vygotsky (1978) and Leont'ev (1978) [12-17]. AT is a concept drawn from the idea that all social action is mediated by tools to reach the objective and gain outcomes. AT reflects that studying or understanding individuals' actions outside the environment is not possible. Thus, many aspects have to be considered to analyze such activity.

Activity theory has four versions (generations), and in this research, in order to have a lens for creating the survey questions, the fourth-generation version of the activity theory is used. The aspects of the activity theory are shown in figure 2 [18].

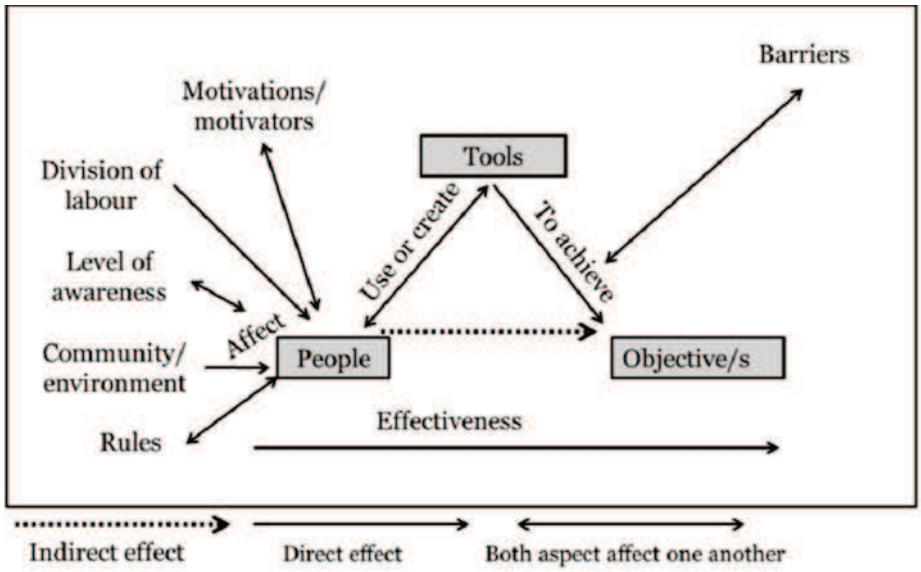

Figure 2: The fourth generation of activity theory.

Therefore, as illustrated in Figure 2, any activity that is intended to be done needs mediation or tools to reach its objectives of it. Furthermore, there are many aspects that will affect the activation process, which are the motivations, barriers, level of awareness, community/environment, rules, and division of labor if needed more than one person to carry it out. In this research, we analyzed all the aspects except the division labor because our investigation focuses on the individuals' exercises.

3.2 Statistical Analysis

Regarding statistical methodology, many types of research focus on models where the dependent variable is categorical. When the dependent variable is categorical, then we use the logistic regression analysis. In this research, the dataset consists of people practicing sports that may use smart devices (categorical variable, 1=yes, 0=no) which is the dependent variable of the model. Logistic regression method is explained as follows (see, Osborne [19]):

Let us consider Bernoulli distribution which has two values 0 and 1. We denote, 1, for success with probability π_i and denote, 0, for fail with probability $1 - \pi_i$. Since the concept of the logistic regression is based on that the dependent variable Y_i ($i = 1, \ldots, p$) is categorical and follows Bernoulli distribution, then the probability π_i differs along the observations as an inverse logistic function of a vector $\mathbf{x}$ ($x_1, \ldots, x_p$) which includes a constant and $p - 1$ explanatory variables:

$$\pi_i = \frac{1}{1+e^{-x_i\beta}}$$

The logistic regression model expresses the logistic function of $P(Y=1|x)$ as a linear function of the predictor variable. The model could be written as

$$P(Y=1|x) = \frac{e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}}$$

The mathematical concept of logistic regression is to define the relationship between outcome (dependent variables) variable and predictor variables (independent variables) in terms of logit: the natural logarithm of odds. Let's consider as simple case where Y is a dichotomous outcome variable categorized as "1" and "0" and X is a continuous predictor variable. Now if we draw a scatter plot we will have two parallel lines corresponding to each outcome variable category. The relationship does not follow a linear trend and hence not possible to describe through a simple linear regression. Logistic regression facilitates this situation by logit transformation on the outcome variable Y. The simplest form of logistic regression model can be written as:

$$logit\,(Y) = \ln\frac{\pi}{1-\pi} = \beta_0 + \beta_1 X \quad (1)$$

Here π is the probability of occurring the outcome Y and π/(1−π) is the odds of success; the ratio of the probability of occurring the outcome Y and the probability of not occurring the outcome Y. β_0 and β_1 are called intercept and slope (regression coefficient) respectively. By taking antilog on both sides of equation (1) we can estimate the probability of the occurrence of outcome Y for a given value of predictor X:

$$\pi = P(Y|X=x) = \frac{e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}} \quad (2)$$

The predictor variable X can be either continuous or categorical. We can extend the logistic model for more than one predictor as well,

$$logit\,(Y) = \ln\frac{\pi}{1-\pi} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_p X_p \quad (3)$$

Equation (3) is the general form of logistic regression model for *p* number of predictors. Regression parameter βs can be estimated by either the maximum likelihood (ML) method or weighted least square method. The value of regression coefficients β_1, ..., β_p indicate the relationship between X's and logit of Y. Coefficient value bigger than 0 indicates an increase in logit of Y with an increase in X and coefficient value smaller than 0 indicates a decrease in logit of Y with an increase in X. When the coefficient value is 0, it indicates there is no linear relationship among logit of Y and predictors X. For the ease of interpretation, we usually report the odds ratio along with the regression coefficient. Odds ratio can be calculated by the following formula, OR = e^{β}

Statistical significance of the regression coefficient can generally be tested using Wald's test and overall model significance can be tested by likelihood ratio test or pseudo R^2 test.

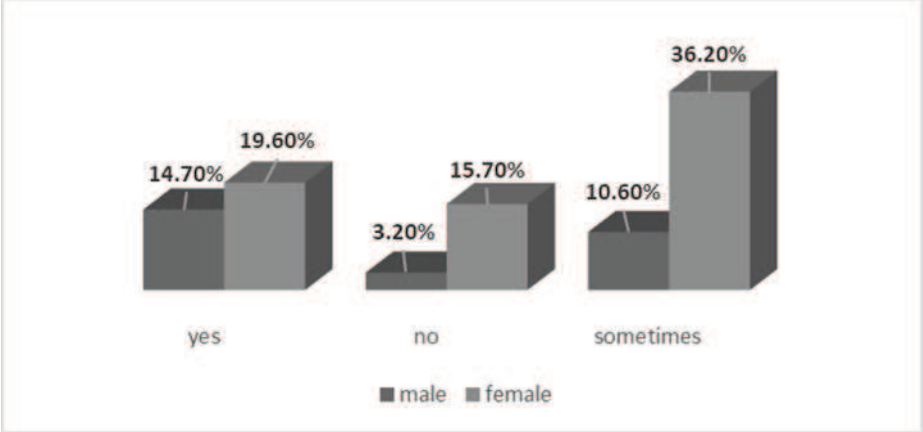

Figure 3: Percentage of male and females according to (physical activity).

4. Data Analysis

In this section, two data analysis were used: Descriptive and inferential statistical analysis, as follows. There are five independent variables: Gender, married status, age, education level and job. And two chosen dependent variables: 1. Using smart devices (technology). 2. Practicing PA as a healthy aspect. The two dependent variables are categorical variables, with 1=yes and 0=no. On the other hand, by focusing to AT, there are five aspects that affected the activation process, which are the motivations, barriers, level of awareness, community/environment and rules. Data analysis is discussed as follows.

4.1 Descriptive Analysis

The data consists of 312 persons, male (89, 28.5%) and female (223,71.5%). Married (179, 57,4%) and single (133, 42.6%). The persons who do PA are 107 and who do not are 59 persons, whether the persons who do PA sometimes are 146 persons. Percentage of males and females according to (practicing PA) are given in Figure 3. The highest percentage is 36.2 % for females doing PA sometimes.

The age, educational level, job, and married status according to gender are given in Figures 4-7

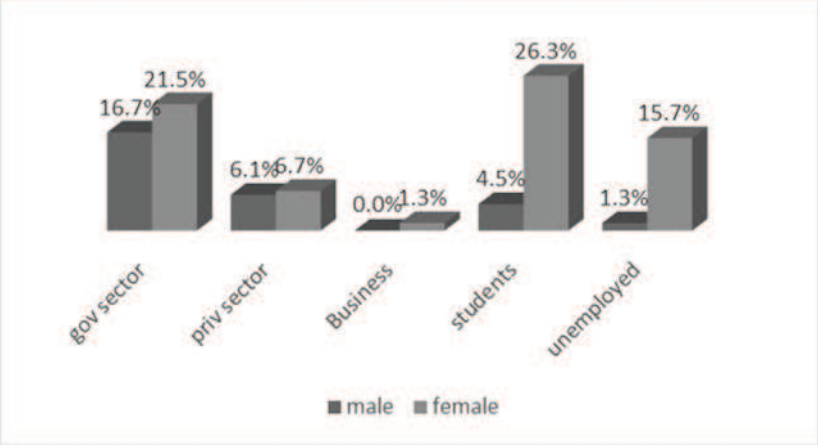

Figure 4: Percentage of males and female according to the job status.

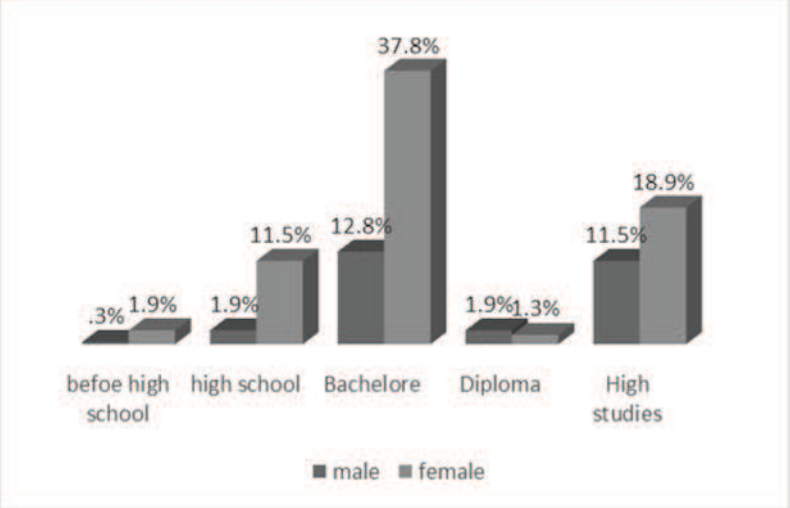

Figure 5: Percentage of males and female according to educational level.

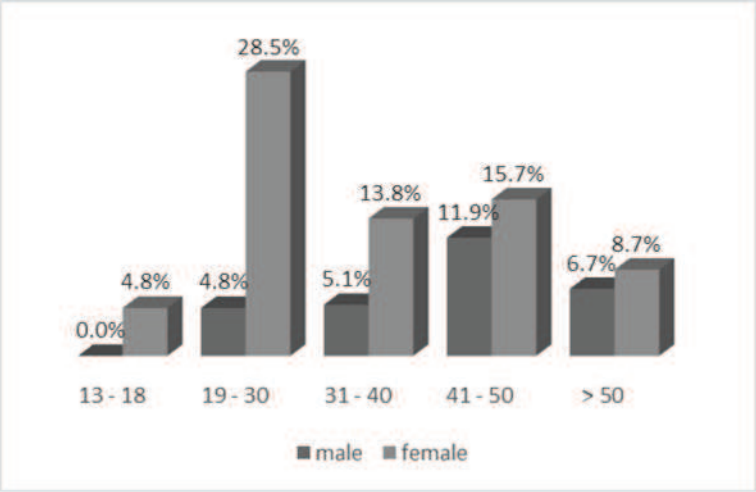

Figure 6: Percentage of males and females according to age.

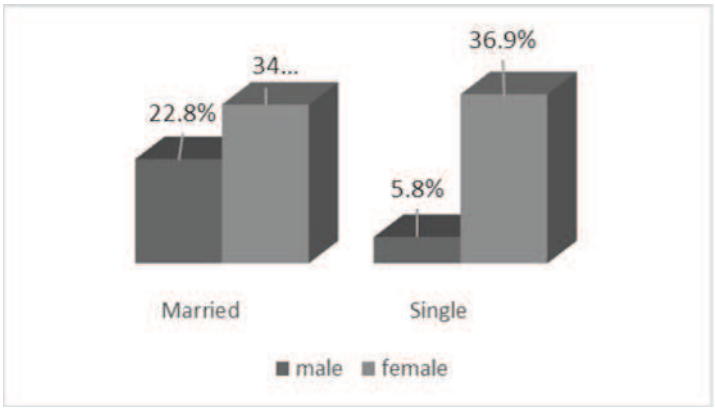

Figure 7: Percentage of males and females according to married status.

Figures 4-7 show that the female gender tends to be more in most of the categories except in the Diploma in the educational level.

The overall sample result in the question of according to **doing sports** is illustrated in Figure 8.

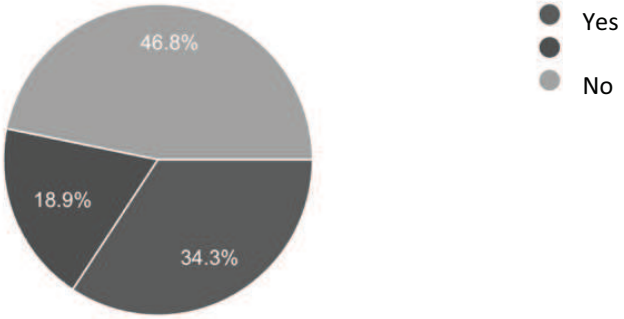

Figure 8. Percentage of practicing sport.

So, in this research, we investigate from the sample who replied "No" reflecting that they do not work out about the **barriers** (reasons, challenges) to do PA, in general, are as follows:

which is one of the activity theory aspects. The reasons based on the sample answers are as follows:

◊ 39 (66.1%) Lack of motivation and desire
◊ 38 (64.4%) Not having enough time
◊ 13 (22%) Not knowing how to exercise
◊ 8 (13.6%) They think that sports are expensive and need tools
◊ 1 (1.7%) They have health problems or injuries that prevent them from exercising
◊ 1 (1.7%) Procrastination/ Laziness
◊ 1 (1.7%) The high gyms' prices

Whereas the **barriers/ reasons** to use **smart devices or applications** (in particular) to do PA are as follows:

◊ 61 (48.8%) I think they are useless
◊ 24 (19%) I think they are expensive
◊ 23 (18.4%) I do not know that there are devices
◊
◊ or applications
◊ 9 (I7.2%) I am having difficulty using technology

Frankly, 23 people (18.4%) is a surprising number of people in this era who do know about the availability of smart devices and applications; this reflected that the level of awareness about the available tools and how to use them need to be addressed.

On the other hand, we have asked people who use technology, about what type of devices or technology do you use to do sports and the answers as follows:

◊ 72 (56.3%) Big fitness equipment such as treadmill or exercise bikes.
◊ 71 (55.5 %) mobile applications and websites.
◊ 59 (46.1%) smart devices and wearable technology such as smartwatches and wearable bands.

With regard to the **motivations** to use technology in sport, we have asked the sample "Modern technologies provide a number of advantages. Do you find the following advantages essential in stimulating exercise?" and the answers were as follows:

◊ Monitoring values related to physical activity (calorie count - heart rate - distance and time - sleep quality).

◊ The interaction and providing simultaneous feedback

◊ Social networking and tracking progress with friends

◊ Defining the goal and following up on its achievement

◊ Ease of use

And regarding the hypothesis which is based on most e-sport research that claims that technology motivates people to practice PA, we asked the question "Do you think that smart devices or applications will help you do physical activity?" and the answers were surprising as shown in Figure 9:

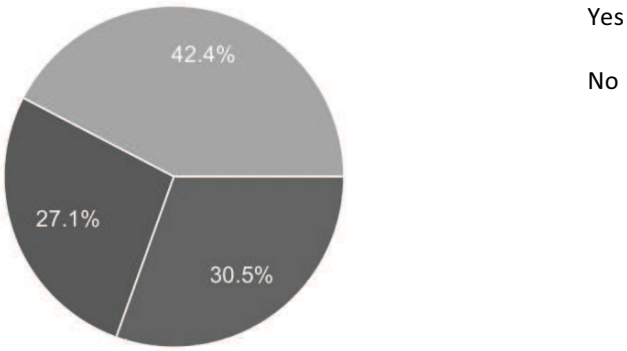

Figure 9. Percentage of the question "Do you think that smart devices or applications will help you do physical activity".

Furthermore, we have asked people if they use any smart devices or applications related to their PA.

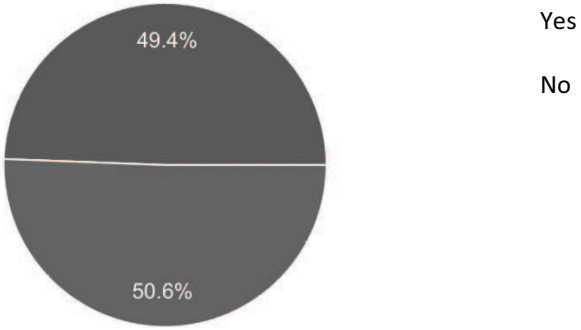

Figure 10: Percentage of the question "Do you use any smart devices or applications related to your PA?

Figure 9 and 10, reflect that technology (using smart devices and applications) have been used to do sports for 50.6% of the sample size and people who do not think that smart devices or applications help them to do PA are only 27.1% of the sample size. Thus, the barriers need to be overcome and the awareness need to be raised.

With regard to environment (community) aspect of AT:

The sample answered the question of "Where do you practice PA?" as follows:

◊ 148 (58.5%) at home

◊ 100 (39.5) at public places

◊ 70 (27.7%) at Gyms

◊ 36 (14.2) at specialized sport clubs

With regard to the objective's aspect of AT:

The sample answered the question of "What are your motivations and objectives from exercising?" as follows:

◊ 180 (71.1%) Desire to maintain a healthy lifestyle.

◊ 129 (51%) Desire to lose weight

◊ 117 (46.2%) Desire to reduce stress and anxiety.

- ◊ 111 (43.9%) Desire to have a toned body
- ◊ 66 (26.1%) As a hobby and recreation
- ◊ 43 (17%) Desire to occupy free time
- ◊ 13 (5.1%) Desire to gain weight or build muscle.
- ◊ 12 (4.7%) Desire to establish social relationships
- ◊ 1 (0.4%) Reducing joint pain,
- ◊ 1 (0.4%) lowering sugar level
- ◊ 1 (0.4%) lowering cholesterol level

4.2 Inferential Statistical Analysis

According to the aim of this article, two hypotheses are given.

The first hypothesis claims that gender, age, married status, education level, job do not have any significant effect on using smart devices while practicing PA. That's it to investigate the tendency of using smart devices (technology) to encourage practicing PA according to gender, age, married status, education level, job.

Let us consider a hypothetical data set on which we can apply logistic regression. The dataset consists of people practicing sports (107 persons) that may uses smart devices (categorical variable, 1=yes, 0=no) which is the dependent variable of the model. We would like to see whether the gender, age, married status, education level, job, have any effect on using smart devices during practicing sports.

We can construct the model as:

Logit (using smart devices) = $\beta_0 + \beta_1$ gender+ β_2 * age + β_3 * married status + β_4 * education level+ β_5 * job (4)

The null hypothesis of the overall model states that all regression coefficients (β_0, β_1, …, β_5) are zero. Rejection of this null hypothesis implies that at least one regression coefficient is non-zero meaning the logistic regression equation in (4) predicts the probability of the (using smart devices).

Regression coefficients are generally estimated by Maximum Likelihood estimation technique using statistical software like SPSS, SAS, Stata or R. The logistic regression analysis for our hypothetical data was carried out by SPSS (version 22).

Hosmer and Lemeshow Test show that the model fitted the data (Chi-square= 3.595, Sig.= .892).

Overall Percentage Correct is 69.2%

Table 1. Results of logistic regression on first hypothetical data

	B	S.E.	Wald	df	Sig.	Exp(B)
Gender (1)	.328	.491	.445	1	.505	1.388
Married status(1)	.835	.603	1.917	1	.166	2.306
Age			1.735	3	.629	
Age(1)	1.037	1.002	1.070	1	.301	2.821
Age(2)	.486	.665	.533	1	.465	1.625
Age(3)	.737	.613	1.447	1	.229	2.090
Education level			2.510	4	.643	
Education level (1)	21.644	40192.969	.000	1	1.000	2512143326.234
Education level (2)	-.243	1.337	.033	1	.856	.784
Education level (3)	.657	.578	1.292	1	.256	1.929
Education level (4)	1.538	1.399	1.209	1	.271	4.655
Job			3.553	4	.470	
Job(1)	.800	.750	1.137	1	.286	2.225
Job(2)	-.216	.755	.082	1	.775	.806
Job(3)	-42.114	56841.443	.000	1	.999	.000
Job(4)	-.969	1.108	.765	1	.382	.380
Constant	-2.306	1.120	4.237	1	.040	.100

From Table 1, we conclude that gender, age, married status, education level, job do not have any significant effect on using smart devices while practicing PA.

The second claim is that technology motivates people to practice PA. That's it to investigate the tendency of using smart devices (technology) to encourage practicing PA.

The second hypothesis was considered persons who do PA sometimes and use smart devices. We would like to see whether the aspects that technology provides (L1: computing values of time, pressure, calories, …, L2: reaction time, L3: competitive with others, L4: determine objectives, L5: easily uses, L6: Free, L7: individual training, L8: no restrictions in place and time), have any effect on practicing PA as a healthy aspect (categorical variable, 1=yes, 0=no).

We can construct the model as:

Logit (practicing PA as a healthy aspect) = $\beta_0 + \beta_1 L_1 + \beta_2 L_2 + \ldots + \beta_8 L_8$ (5)

The null hypothesis of the overall model states that all regression coefficients (β_0, β_1, …, β_8) are zero. Rejection of this null hypothesis implies that at least one regression coefficient is non-zero, meaning the logistic regression equation in (5) predicts the probability of the (practicing PA as a healthy aspect).

Hosmer and Lemeshow Test show that the model fitted the data (Chi-square= 0.988, Sig.= .995).

Overall Percentage Correct is 86.4%

Table 2. Results of logistic regression on second hypothetical data

	B	S.E.	Wald	df	Sig.	Exp(B)
L1			.006	2	.997	
L1(1)	-28.976	17428.410	.000	1	.999	.000
L1(2)	-.088	1.136	.006	1	.939	.916
L2			3.254	2	.197	
L2(1)	2.445	1.676	2.129	1	.145	11.532
L2(2)	-.794	1.153	.474	1	.491	.452
L3			2.948	2	.229	
L3(1)	-.769	1.222	.396	1	.529	.464
L3(2)	-3.345	1.951	2.939	1	.086	.035
L4			4.611	2	.100	
L4(1)	-.757	2.065	.134	1	.714	.469
L4(2)	-4.713	2.235	4.448	1	.035	.009
L5(1)	2.507	1.813	1.913	1	.167	12.274
L6			8.119	2	.017	
L6(1)	9.672	11.326	.729	1	.393	15864.911
L6(2)	6.673	2.345	8.100	1	.004	790.554
L7			8.056	2	.018	
L7(1)	.206	1.387	.022	1	.882	1.228
L7(2)	-6.090	2.177	7.825	1	.005	.002
L8			7.136	2	.028	
L8(1)	3.976	2.093	3.609	1	.057	53.281
L8(2)	3.077	1.359	5.126	1	.024	21.685
Constant	-.880	.699	1.585	1	.208	.415

The results on the variables in the equation suggested that the independent variables namely L4, L6, L7 and L8 have Sig. less than 0.05 and they are all significant (i.e., they have significant regression coefficients). Hence, they all have influence over the chance to do PA as a healthy aspect.

5. Discussion

This research surprisingly found that in this era there are still people who do know about the availability of smart devices and applications; this reflected that the level of awareness about the available tools and how to use them needs to be addressed. On the other hand, this research proves what other studies show that technology motivates people to practice sports or physical practices in particular. What is new in this research is that we have used the 4th generation of AT while other researchers have used the other generations of the theory.

6. Conclusion and Recommendations

In observing the impact of using technology on motivating PA, we found that gender, age, married status, educational level, and job do not have any significant effect on using smart devices to workout. Highlighting some related aspects of the 4th generation of AT (motivations, challenges, level of awareness), we assumed that using technology (smart devices) will help to motivate people to do sports, and we found from the logistic regression analysis that based on the motivation of the person (such that, practicing sports as a healthy aspect), smart devices were used for their useful measures, easily uses, …, etc. Whereas the factors: Gender, married status, age, educational level, and job, do not affect (using devices in sports). Accordingly, our results show that the hypothesis which claims that technology motivates people to practice sports has been proved.

Furthermore, two categories of barriers have been identified. One is related to doing PA in general and the other one is related to using technologies to do sports. The biggest barrier in the first one is the lack of motivation and desire to do sport, and the biggest barrier in the second one is that some people still think that technologies are useless.

More research would be recommended to investigate other hypotheses about motivations or obstacles against using technology in PA and awareness camping need to be conducted.

This research recommends that Awareness camping needs to be conducted to motivate people to do PA as a health aspect even by using technology or other equipment. Creating more suitable smart devices that achieve people's objectives could motivate them to do PA as well. Furthermore, similar research can be conducted in another country to compare different contexts.

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I declare that this research has been composed solely

by ourselves and that it has not been submitted, in whole or in part elsewhere. And there is no clash of interests.

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