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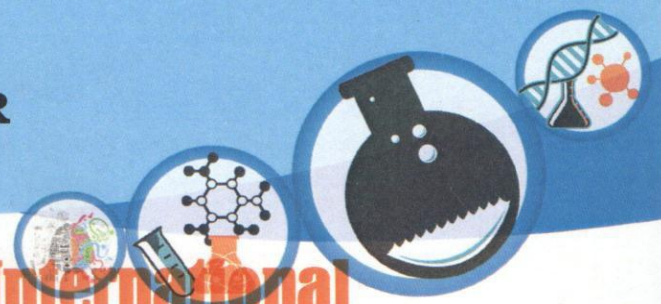
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4th USM-PSU-NSTRU-MU International Conference
On Arts & Sciences
"ENLIGHTENING THE LOCALS, PROSPERING THE NATION"



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11

4th USM-PSU-NSTRU-MU International Conference on Arts and Sciences

“Enlightening The Locals,
Prospering The Nation”





**Proceeding of 4th USM-PSU-NSTRU-MU International
Conference on Arts & Sciences**

“ENLIGHTENING THE LOCALS, PROSPERING THE NATION”

**Universiti Sains Malaysia, Penang, Malaysia
14th – 15th December 2015**

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PREFACE

I am delighted to be presented this opportunity to pen a few words in conjunction with the USM-PSU-NSTRU-MU *International Conference on Arts and Sciences 2015*, organised by Centre for Research Initiative, Liberal Arts and Social Science, Universiti Sains Malaysia in collaboration with Research Unit, Curriculum dan Faculty Development Office, Educational Services Division, Prince of Songkhla University, Pattani Campus, Phd Graduate School, Nakhon Si Thammarat Rajabhat University and Massey University is organizing the 4th USM- PSU-NSTRU-MU International Conference On Arts And Sciences 2015. The theme of the conference is "Enlightening the Locals, Prospering the Nation", covering both for arts and sciences aspects.

The main goal of this conference is to provide a platform for discussion and sharing of establishing a state of the art event, topics and findings regarding the relationships between forms and kinds of art and sciences. It also aims provide opportunity and to stimulate interdisciplinary discussions and networking to further enhance the knowledge to interact and discuss and sharing their research result of academicians, practitioners, researchers, students and professionals on issues about future art and sciences research. The invited speakers were chosen based from their expertise field. Their presentations will be most beneficial to all who wish to broaden their knowledge about these topics. All presented articles will be published in the official conference proceedings, which will have an assigned ISBN number, competitive and best papers will have the opportunity to be fast-tracked to selected journals, a SCOPUS indexed journal.

All papers presented went through strict peer-reviewed before final papers being selected. The author wishes to acknowledge the contributions of all members of the Scientific Committee and also the conference the secretariat with the hope that results from the papers presented in the conference would be translated into meaningful and real cases.

I am confident that all participants will benefit from this conference.

Best wishes,

Professor Dr. Ruslan Rainis

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DEVELOPMENT MULTIFACTOR SOFTWARE FOR CANOEING ATHLETES SELECTION

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ABSTRACT

The prospect of talent tracking canoeing athletes in Indonesia is still very limited. The implementation of talent scouting canoeing athletes are not systematic, and sustainable. Likewise, in the selection of potential athletes. It is because there is no instrument selection canoeing athletes multifactor includes physical and psychological. This study aims to establish the dominant indicators for selection canoeing athletes based on physical and psychological approach and to develop the form of software which can be used for canoeing athletes selection.

The type of this study is the development research with a quantitative approach. The variables are: The independent variables : (1) Physical includes: anthropometric, biomotor abilities, physiological (2) Psychological Skills (PSIS R-5) includes: self-confidence, concentration, motivation, mental preparation, team emphasis, and anxiety control. The dependent variable is achievement canoeing 500 meters.

Tests and measurements are performed by the Sports Science and Fitness Center (SSFC) laboratory State University of Surabaya, East Java. The subject are canoeing athletes on training center East Java (N =25). The data analysis was conducted 2 phase. The analysis of phase I consist of Content Validity Ratio (CVR) and the rater. The phase II conducted by factor analysis and confirmatory factor with Partial Least Squares (PLS).

The results of this research are: (1). Physical factors : a.7 anthropometric variables (height, sitting height, arm span, stretch length, wide hips, legs length, shoulder width), b. 8 biomotor ability variables (leg muscle strength, back muscle strength, arm muscle strength, abdominal muscle endurance, arm muscle endurance, flexibility, lower extremity power, and balance). c. 3 physiological variables (aerobic capacity, anaerobic capacity, lungs vital capacity). (2). Psychological Skill factors are: self-confidence, concentration, motivation, mental preparation, team emphasis, and anxiety control.

The conclusion of the study is the selection of canoeing athletes can be done by measuring the physical and psychological indicators. The dominant indicators physical and psychological factor can be used for development the equations model and software in the canoeing athletes selection.

Key Words: Software, multifactor, selection, canoeing

INTRODUCTION

Indonesia's sports achievements in the Olympic Games, Asian Games and SEA games are still decreasing. And various efforts have been made to improve sports performance in Indonesia, like Garuda Emas, Indonesia Bangkit, Program Atlit Andalan (PAL), Indonesia Prima and Pelatnas has been rolled out. However, the success of programs implemented in Indonesia is still not optimal. Many

reasons cause less optimal range of the programs, like stage and sustainable development is still not good enough, especially breeding and talent athletes building.

Indonesia canoeing athlete's performance is still left behind when compared to athletes from Europe, America, Australia, China, Korea, and even Southeast Asia such as Thailand and Vietnam. The process of coaching in canoeing still filled by crash program and not consistently. The selection of athletes based on the participation and external encouragement. The progress may still exist, but it is difficult to maintain consistently. Discourse about how to develop the sport in a systematic and a sustainable has not appeared yet. Building sport can not only based on the knowledge and experience that is speculative and intuitive. Like and dislike in the athletes process selection are still happens. Potential athletes or best athletes may not be a core player.

Mutohir (2002) suggested "Actually achievements in the sport can be observed (observable), measurable and predictable". Canoeing is one of sports which has special characteristics in anthropometric factors (proportion, composition and structure) of the body. Psychological factors have great influence in canoeing. It's because canoeing is a sport that is carried out in the wild nature, has characteristics that prioritize physical ability with aerobic endurance dominant element (50%), with the emergence of excessive fatigue will affect the psychological condition (Bompa, 2009). Nowadays, there no model that canoeing athlete multifactor selection include physical, psychological and performance in the form of software. The approach used for the canoeing athletes selection today are often based on the evaluation of the factors, for example, based on the results of a championship. The effect of this approach is still vulnerable like and dislike, conflict of interest and manipulation of data so Indonesia canoeing athletes are not compete at the International level championship.

The selection of athletes is the momentum that determine the success and achievements of athletes in an event or championship. The quality of athletes who will be sent in a championship determined by the quality of the selection. Based on those conditions, the selection of athletes should be carried out based on the needs of the branch of sport achievement. It means that the selection process should be based on the indicators determined sport achievements. There is a very fundamental difference determinants of achievement of each sport (Kurist & Florescu in Bompa, 1999). MacQuaker mentions several scientific approaches of major concern in the selection of athletes, there are physiological/anthropometry approach, performance approach, and psychological approach. (MacQuaker, downloaded from <http://www.sportscotland.org.uk/> dated March 1, 2012). According to Regnier (1983), the selection of athletes is done by measuring physical, physiological, psychological, and social attributes (Regnier, Salmela, & Russell, 1993; Falk, Lidor, Lander, & Lang, 2004). Tanner was quoted as saying by MacQuaker mention the selection of athletes is to look at the characteristics of the body (body characteristics) and biometric profile (MacQuaker, downloaded from <http://www.sportscotland.org.uk/> dated March 1, 2012). Selection of athletes for individual sports such as canoeing, weightlifting, cycling, and athletics is through a special anthropometry approach and physiological approach (Hoare and Warr, 2000). Anthropometric and specific physiology in question is adapted to the characteristics of the sport branch. (Partridge, downloaded from C.partridge@lboro.ac.uk).

Theoretically canoeing achievement numbers are influenced by several factors such as physical, technical, tactical, psychological / mental, and supported by social factors and nutrients. Furthermore, the researcher developed model of construct canoeing achievement numbers selection as follows:

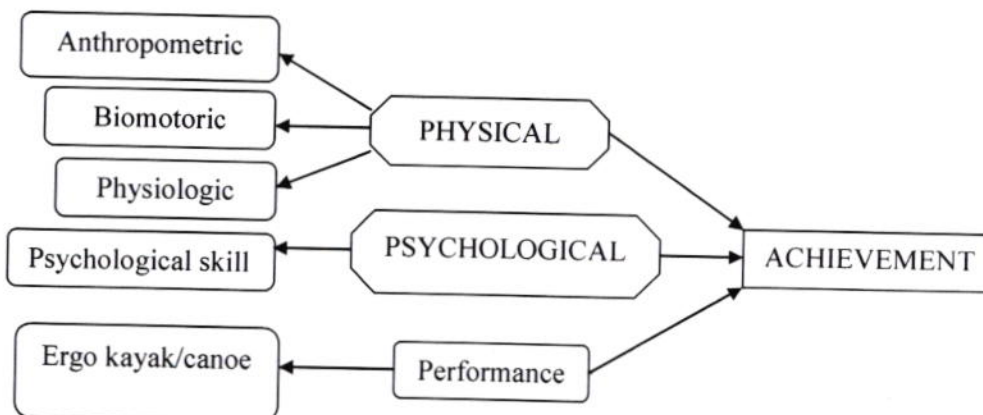


Figure 2.1. Simple models Canoeing Athlete Selection

Physical factors include all attributes that appear on the anthropometric variables, biomotor, and physiological. Anthropometric dimensions are related to the structure, composition, and size of the human body. Anthropometric related to the mechanics of human motion. If it is connected with mechanical paddle boat canoeing, good anthropometric is the benefit of motion and speed boats. Anthropometric canoeing athletes include leg length, arm length, sitting height, shoulders wide, wide hips, weight, high, and long legs. Biomotor is a basic component of physical condition in the sport. Canoeing is a sport that is physically, it means that the physical use is dominant in appearance. Biomotor dominant component in the sport of canoeing is a strength, endurance, speed, flexibility, balance and power. Physiological condition is the entire organ function that supports human motion. Physiological components that really support the achievement canoeing athlete is aerobic, anaerobic capacity, and lung vital capacity. Ergo kayak is an engine originally developed for the exercise. As the development of technology and the tools used to measure the performance of canoeing athletes. Canoeing athlete performance measured through ergo test .

While the psychological factor is anything that arises from the psychological conditions that affect the motoric behavior. There are six psychological skill factors were dominant in competitive sports are: confidence , motivation , concentration , anxiety control, mental preparation, and team emphasis (Mahoney et al, 1987, in Elferink-Gemser, MT, Visscher, C., and Lemmink, KAPM, 2015). These six factors are associated with the appearance of an athlete during training and competition. Various psychological symptoms will occur when the training and competition sourced from the fifth factors. The example of capabilities focusing on the activities of the competition is often influenced by the concentration of these athletes. Confidence, goal setting, and persistence is determined by the motivation of athletes. The sixth psychological factors is called psychological skills.

Mahoney (1987), have develop a instrument to measure psychological skills namely Psychological Skills Inventory for Sport R-5 (PSIS R-5) consist of 51 items which is subsequently revised to 45 items and revised again to 44 items. Instrument PSIS R-5 consists of 44 items statement that control anxiety (8 items), concentration (7 items), confidence (8 items), mental readiness (6 items), motivation (8 items), the focus of the team (7 items). PSIS R-5 is a measurement instrument that multifactor psychological skills including cognition skills are influences the sport appearance. PSIS R-5 has a reliability of 0.567 with a coefficient alpha = 0.636.

RESEARCH METHOD

The type of this study is the development research with quantitative approach that uses the correlation method. This research aims to develop software products and test the effectiveness of those products. The products produced in this study is a computer software program that can be used in analyzing and interpreting the data results of the test and measurement of physical factors, psychological and athletes performance . So based on the data interpretation of can be used as a basis of canoeing athletes selection

Research subject in this study is canoeing athletes at training center East Java (N= 25).

Research variable are:

1. Independent variable (independent variable) are:
 - a. Physical factor include anthropometrics, biomotorics, and physiology
 - i. Anthropometric include: height, weight, sitting height, body fat, arm span, wide hips, long legs, shoulders wide, and long legs
 - ii. Biomotorics include the strength of muscles (legs, back, arms), muscular endurance (abdomen, arms, legs), flexibility, legs muscle power, and balance.
 - iii. Physiological include aerobic capacity, an-aerobic capacity, and vital lung capacity.
 - b. Psychological factor is psychological skills include: self-confidence, concentration, motivation, control anxiety, mental readiness, and focus groups.
 - c. Performance: Ergo kayak 500 meters
2. The dependent variable (dependent variable): achievement (time) rowing canoeing 500 meters.

Data collection techniques in this study are classified into two, named performance data (physical and achievement) and psychological data. Performance data obtained by test and measurement, while psychological data obtained by PSIS R-5 questionnaires. The data analysis was conducted using descriptive, and inferential statistics. Statistical analysis use bivariate correlations, multivariate (multiple regression and factor analysis) to carry out the reduction of indicators, multiple regression analyzes sub-sets of indicators of achievement, correlation univariate analysis to see the athlete's potential in measured parameters. Factor analysis is to identify factors pattern in which each factor (or group of similar items) measure the dimensions to be measured but does not measure other dimensions. The purpose of this analysis is to identify indicators that have construct validity (construct validity).

RESEARCH RESULT

Research phase 1 with the following results:

1. Factors, variables and indicators of the selection of athletes canoeing literature study results

FACTORS	VARIABLE	INDICATORS
PHYSICAL	Atropometrik	Height
		Weight
		Leg length
		Arm length
		Shoulders width
		Wide hips
		Sitting height

		Body fat
		Stretch length
	Biomotorik	General endurance (VO ₂ mak)
		Arm muscle endurance
		Leg muscle endurance
		Shoulder muscle strength
		Back muscles strength
		Grip strength
		Leg muscle strength
		Arm muscle strength
		Abdominal muscle strength
		Leg muscle explosive power
		Flexibility of the hip joint
		Upper extremity explosive power
		Reaction speed
		Running speed
		Anticipation speed
		Agility
	Physiological	An-aerobic capacity
		Vital lung capacity.
		Aerobic capacity
Psychological	Psychological skills	Concentration
		Self-confident
		Control anxiety
		Motivation
		Mental readiness
		Group focus
Performance		Canoeing time 500 m

2. Factors determination, variables and results indicators of expert judgment.

Factors determination, variables and indicators canoeing coaches (N=6). The data is then analyzed the content validity using analysis of Content Validity Ratio (CVR). CVR value obtained in each item matched with a minimum value of the CVR tables based on tests of significance $p \leq 0,05$. Based on the CVR analysis the results are as follows:

- a. Anthropometric indicators: height, leg length, arm length, shoulder width, sitting height, stretch length and body structure.
- b. Biomotor indicators: Arm muscles endurance, arm and shoulder muscle strength, back muscle strength, abdominal muscle strength, balance, flexibility hip joint, leg muscle explosive power, speed anticipation.
- c. Physiological indicators: an-aerobic capacity, aerobic capacity, lungs vital capacity.
- d. Psychological indicators: self-confidence, concentration, motivation, control anxiety, mental readiness, and focus groups.
- e. Performance indicators: canoeing time 500 meters.

The result of phase II study are as follows:

The data analysis in phase II study conducted by factor and confirmatory factor analysis. Factor analysis identify patterns of factors in which each factor (or group of similar items) measure the dimensions will be measured but does not measure other dimensions. The purpose of this analysis is to identify indicators that have construct validity. Factor analysis supported a tool of data analysis program SPSS version 13.0.

Confirmatory factor analysis at this stage using Partial Least Square (PLS). PLS is a structural equation model that is a multivariate analysis technique (Ghozali, 2008) which allows researchers to examine the relationship between variables are complex not only recursive, but also non recursive to obtain a comprehensive picture of the overall model.

At this stage, the trial against all the indicators produced at the first stage gauge indicators are grouped into two: the measurement of physical and psychological factors. Each physical variable factor analysis with KMO and Bartlett's test. Based on the results of the calculation of anthropometric variables showed that the magnitude of the value Bartlett Test of Sphericity was 111.944 at 0.000 significance. It means that in this study there was a significant correlation between variables and the results of calculation of 0,829 KMO so that the adequacy of the sample belongs to the category satisfying (Santoso, 2002). At this stage also conducted a factor analysis to perform the extraction of the set of variables that exist $KMO > 0,5$ in order to form one or more factors. The method used for extracting is Principal Component Analysis and Varimax rotation factor method.

Factor rotation analysis was conducted using varimax rotation, and the interpretation of results is done by looking at a loading factor (≥ 0.5). Loading factor is a number that indicates the magnitude of correlation between a variable and other form factors. Based on the Matrix Component table, there were height, arm span, long sleeve, high sit, and high rise included indicator which supports anthropometric variables that will be used as indicators of the selection of athletes canoeing.

Biomotoris variable calculation results showed that the magnitude of the value Bartlett Test of Sphericity was 52.507 on the significance of 0.003 means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.560 so that the adequacy of the sample belongs to the category satisfactory. It can be concluded that the overall instrument for measuring variables biomotoris declared valid. Based on the table Initial Eigenvalue derived factor that has eigenvalue greater than 1.0 have been the biggest factor among other components. These factors explain 35.151% of the total variance of variables that influence. Based on the results from table Matrix Component variable arm muscle endurance, Abdominal Muscle endurance, muscle strength of the legs, the back muscle strength, balance, and leg Power include in biomotorik variables that will be used as an indicator in the athletes canoeing selection.

Physiological variable calculation results show that the magnitude of the value Bartlett Test of Sphericity is 8,33 on the significance of 0,040 means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.510 so that the sample's adequacy belongs to the satisfactory category. Based on the Initial Eigenvalue table derived factor that has eigenvalue greater than 1.0 have been selected the biggest factor among other components. These factors explained that 52.933% of the total variance influenced variable. Based on the results obtained from Component Matrix table variable aerobic capacity and an-aerobic include in physiological variables that will be used as an indicator in the athletes canoeing selection.

Psychology skills measuring tool using Psychological Skills Inventory for Sports (PSIS R -5). The requirements to test the good instrument can be seen from validity and reliability of these tools. Validity used in this study is the construct validity (construct validity). The construct validity estimation is done by measuring the items and the total score (Anwar, 2009). Limit power index difference minimal items used as a valid point was 0.30.

Results of test calculations different point, the trial against 44 items of psychological skills have different power index ranged from 0.514 to 0.814. After testing the validity conducted, then done the confirmatory factor test. This test is done to know whether these items represent the construct being measured or in accordance with the factors. Based on confirmatory factor calculation that all the questions have value loading factor of ≥ 0.5 and has been a factor as it has been determined that these items can be used for further research.

Psychological variable calculation results showed that the magnitude of the value Bartlett Test of Sphericity was 63.459 at the 0.000 significance. It means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.599 so that the adequacy of the sample belongs to the category satisfactory. Based on the table Initial Eigen value derived factor that has eigenvalue greater than 1.0 have been the biggest factor among other components. These factors explained that 50.920% of the total variance is the, that influence variables. Based on the results obtained from table Component Matrix variable motivation, confidence, control anxiety, mental preparation, team focus and concentration into the psychological variables that will be used as an indicator in the selection of canoeing athletes.

The tests of inner model conducted to determine the relationship between the constructs in this study. Structural model was evaluated using the R-square for the dependent construct. Changes in the value of R-square can be used to assess the effect of certain latent variables independent of the dependent latent variables and whether to have a substantive effect. The analysis shows that the R-square values for anthropometric variables which include the achievement high, high-sitting, arm length, height and arm span of 0.341. It means that the performance is explained by anthropometric variables 34.1%. Biomotorik variables which include: Durability arm muscles, Abdominal Muscle endurance, muscle strength of the legs, the back muscle strength, balance, and Power leg at 0.373. It means that the performance is explained by anthropometric variables 37.3%. Physiological variables which include: capacity aerobic and an-aerobic amounted to 0.334. It means that the performance is explained by physiological variables at 33.4%.

Discussion of the results

After testing of all indicators in the first phase conducted, each variables of physical factor analysis analyzed with KMO and Bartlett's test. In the anthropometric variables obtained of eight indicators. There are high achievement, sitting height, arm length, height and arm span, are indicators of dominant influence anthropometric variables that affect the appearance of canoeing athletes. Based on factor analysis derived five aspects anthropometric indicators of the value of communality that shows kesahian (validity), so that the indicator is valid. Biomotorik variables which include: Durability arm muscles, Abdominal Muscle endurance, muscle strength of the legs, the back muscle strength, balance, and power are indicators of dominant influence biomotorik variables that affect the appearance of canoeing athletes. Based on the factor analysis obtained biomotoris aspects of the six indicators by showing the communality values validity, so that the indicator is valid. Physiological variables which include: capacity aerobic and an-aerobic are indicators of dominant influence physiological variables affecting the performance of canoeing athletes. Based on the physiological aspects of factor analysis

obtained with the two indicators that show the communality values validity, so that the indicator is valid. Psychological variables include: motivation, confidence, control anxiety, mental preparation, team focus and concentration are indicators of dominant influence psychological variables affect the performance of athletes canoeing. Based on the analysis of the psychological aspects of the factors obtained with the six indicators show the value of communality validity, so that the indicator is valid.

The determination of the indicators are in line with the opinion of the experts. Anthropometric variables influence the efforts of achievement in the sport rowing of canoeing numbers. Dragan as quoted by Bompá (2007) mentions that anthropometric variables affect canoeing are: height, leg length and shoulder width. Meanwhile, according to the cited Radut Bompá (1999) mentions that the anthropometric variables which affect the achievement of canoeing is also high. There are some indicators mentioned experts, but this research has not been shown there is any affect of fat as stated by Borms (1996) and Kearney (2002), and also the seat height as proposed by Radut cited by Bompá (1999).

Biomotorik variables that affect performance in canoeing indicator is flexibility (Patel & Greydanus, 2002; Radut in Bompá, 1999), agility, power leg (Fox, D., 2010), muscular endurance (Dragan in Bompá 2007), muscle strength (Patel & Greydanus, 2002). While the physiological variables that affect the sport of canoeing performance indicator is the aerobic capacity and anaerobic capacity (Dragan in Bompá 2007). Vital lung capacity as proposed by Patel & Greydanus (2002) has not been proven influence this study. It is very possible because it has been proven with aerobic capacity.

Psychological skills related to performance in sports such as motivation, concentration, control anxiety, the team's focus, confidence, and mental preparation (Mahoney, et al., 1987). Confident, cognitive anxiety and somatic anxiety affect sports performance (Lesser & Murphy, 1988).

CONCLUSION

Based on data analysis obtained, we can conclude that:

- a. Anthropometric indicators: height, arm span, long sleeves, high seating, and high achievement
- b. Biomotorik indicator: arm muscle endurance, muscular endurance abdominal, leg muscle strength, back muscle strength, balance, and power
- c. Physiological indicators: an-aerobic capacity and aerobic capacity.
- d. Psychological indicators: concentration, confidence, control anxiety, motivation, mental readiness, and focus the team
- e. Performance indicators: time rowing distance of 500 meters.

SUGGESTION

Based on the conclusions, the suggestions of this study are:

- a. This study should be continued, to get a software that is implementable and multifaktoral.
- b. In selecting canoeing athlete must consider the physical factors that include anthropometric, biomotorik, and physiological and psychological factors such as the concentration, confidence, control anxiety, motivation, mental readiness, and the focus of the team.

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