POLYDETECT™ - POLYGRAPHIC METHOD FOR COUNTERPRODUCTIVE BEHAVIOR INDEX PROFILING

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ABSTRACT

*Various tools have been utilized to help detect counterproductive behaviors including the use of pencil and papers methods and polygraph techniques. The purpose of this paper is to study, design and develop a proof-of-concept polygraphic method for counterproductive behavior index profiling system for human resource selection besides building and developing polygraphic repository of counterproductive behavior index profile. 10 major areas are covered namely alcohol use, computer abuse, credibility, customer service, fundamental data, illegal drug use, sexual harassment, theft propensity, work attitude, and work history. Main advantages: 3 major areas of concerns, namely little or no concerns (**Angel**) for lower scorers of 0-33, normal concerns (**Human**) for medium scorers of 34-55 and serious concerns (**Devil**) for higher scores of 56-100 are developed with the ability of producing radar charts for each areas of concern. American Polygraph Association members trained as Polygraph Examiners shall be the primary user of this system for pre employment purposes and employment screening. It also facilitates human resources department for personnel selection. This research focuses on the Axciton™ and Lafayette™ polygraph instruments that use the PolyScore algorithms and development of Polygraphic Method for Counterproductive Behavior Index Profiling System – **POLYDETECT**™. Information System Research Design Framework and Multiple Perspective Framework are being utilized for the purpose.*

Keywords: *Polygraph, Counterproductive Behavior Index Profiling, Repositories, Information System Design Research Framework, Multiple Perspective Framework.*

1. INTRODUCTION

The quality of Malaysian's human capital will be the most critical element in the achievement of the National Mission and thus human capital development is the key thrust in the Ninth Malaysia Plan. Security issues in any employment include finding the right human capital. Finding the right people for the right job involves pre employment screening. Various tools have been employed to help detect counterproductive behaviors including the use of the use of pencil and papers methods and polygraph techniques.

Employee behaviors can be classified into those that benefit the organization and those that hurt it. Most of our psychological research has focused on the former, concentrating on how we can enhance performance. However, from the organizational point of view, there exists a negative side to behavior, in that often employees commit acts that can be detrimental.

Counterproductive work behavior is behavior that is intended to have a detrimental effect on organizations and their members. It can include overt acts such as aggression and theft or more passive acts, such as purposely failing to follow instruction or doing work incorrectly. Counter productive work behavior has been conceptualized in a number of ways, including organizational aggression (Neuman & Baron, 1998; Fox & Spector, 1999), antisocial behavior (Giacalone & Greenberg, 1997), delinquency (Hogan & Hogan, 1989),

deviance (Hollinger, 1986; Robinson & Bennett, 1995), retaliation (Skarlicki & Folger, 1997), revenge (Bies, Tripp, & Kramer, 1997), and mobbing/bullying (Knorz & Zapf, 1996).

Presently, there are two research done on counterproductive behavior namely Warwick (1992) and Richard I. Lanyon, Leonard D. Goodstein (2004)

Warwick (1992) developed pre-employment screening tools (pen and pencil) that provide employers with a cost-effective and valid means of identifying job applicants with tendencies toward dishonesty and other forms of counterproductive behavior. The objective is to assist employers in reducing the hidden costs that must be absorbed when employees prove untrustworthy and unreliable.

Ten scales have been researched and validated to assess work-related attitudes found to be critical to productive on-the-job behavior. They are: 1. honesty, 2. non-violence, 3. drug avoidance, 4. tenure, 5. employee-public relations, 6. emotional stability, 7. safety, 8. work values, 9. validity, and 10. applicant employability index. Temple, Warwick (1992).

Counterproductive Behavior Index (CBI) pen and pencil) developed by Richard I. Lanyon, Leonard D. Goodstein (2004) is a 120-item, true-false questionnaire developed to assess five aspects of counterproductive workplace behavior: Dependability Concerns, Aggression, Substance

Abuse, Honesty Concerns, and Computer Abuse, plus an overall measure of Total Concerns. It also yields a Good Impression score. Richard I. Lanyon, Leonard D. Goodstein (2004).

CREDO (**C**entre for **R**esearch, **E**ducation and **D**evelopment of **O**rganization) PERSONALITY PROFILE(CPP) (1977) – developed by Brain Dynamics Global is a tool (pen and pencil) for personality profiling but not on counterproductive behavior index profiling.

This research explores the fields of polygraph technology, psychology, physiology, sociology, and .information technology /information system

2. POLYGRAPH

For as long as human beings have lived and deceived one another, people have tried to develop techniques for detecting deception and finding truth. Polygraph is a tool for the purpose. Polygraph testing is used for three main purposes: event-specific investigations (e.g., after a crime – murder, rape, theft); employee screening, and pre employment screening.

The term "polygraph" literally means "many writings" (APA, 1999). A polygraph instrument will collect physiological data from at least three systems in the human body. Convoluted rubber tubes that are placed over the examinee's chest and abdominal area will record respiratory activity. Two small metal plates, attached to the fingers, will record sweat gland activity, and a blood pressure cuff, or similar device will record cardiovascular activity (Matte, 1996).

The American Polygraph Association (APA, 2000) believes that scientific evidence supports the high validity of polygraph examinations. Thus, such examinations have great probative value and utility for various uses in the criminal justice system. However, a valid examination requires a combination of a properly trained examiner, a polygraph instrument that records as a minimum cardiovascular, respiratory, and electrodermal activity, and the proper administration of an accepted testing procedure and scoring system.

Polygraph is clearly stated in **Yasin** the 36th **Surah** of the Holy Quran -65: "On that Day it will not be necessary to record their confession. Their own hands will speak to us and their feet will bear witness to whatever crimes they had committed. Their deeds will become open proof against them. Man will stand witness against his own 'self'".

86. Pada waktu itu Kami meteraikan mulut mereka (sejurus) dan (memberi peluang kepada) tangan-tangan mereka memberitahu Kami (kesalahan masing-masing) dan kaki mereka pula menjadi saksi tentang apa yang mereka telah usahakan.

65. That Day shall We set a seal on their mouths. But their hands will speak to us, and their feet bear witness, to all that they did.
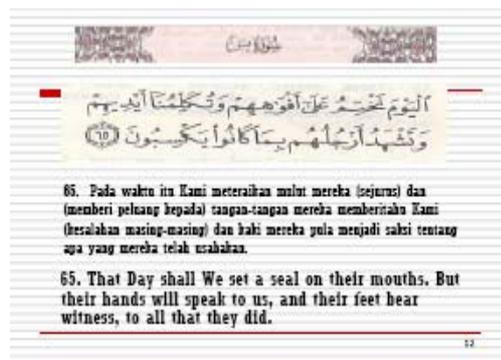
2.1 QUESTION FORMULATION

Question formulation is the key component to a successful polygraph examination. Principles of test questions construction or formulation are clearly noted by both researcher/polygraph examiners below:

1. Test questions are like tools. The Examiner needs to use the proper tools to get the task accomplished in the most efficient manner. Using the wrong tools may cause diagnostic errors, inconclusive results or strong criticism from other professionals. (Thompson, H.B. (2000) - Polygraph Test Question Source Book. Maryland Institute of Criminal Justice.

2. One of the clinical aspects of polygraph testing is the formulation of questions. (Ansley, Norman, 1998) – Polygraph Journal 1998(27(3).

Areas Covered in Polygraph Pre Employment Testing and Test Question Constructions in the Research.

1. Alcohol Use - Will drinking interfere with his work or attendance?
2. Computer Abuse - Is he using the computer that is unrelated to work activities?
3. Credibility - Is he trying to beat the test by deliberately lying?
4. Customer Service - Will he encourage your customer to return or drive them away?
5. Fundamental Data -Is he hiding recent criminal behavior, debts problems or absenteeism?
6. Illegal Drug Use - Does he currently use illegal drugs?
7. Sexual Harassment - Is he causing problems to opposite sex through remarks, jokes or offensive behaviors?
8. Theft Propensity- Will he steals from the company?
9. Work Attitudes - Will he get along with his supervisors and co-workers?
10. Work History - Is he being truthful about past jobs and reasons for leaving?

2.2 EFFECT OF RACE AND CROSS-CULTURE

Further research on effect of race and cross-culture on polygraph were done by:

a. Donald J. Krapohl and William B. Gary. Jr. (2004). Exploration into the Effect of Race on Polygraph Scores and Decisions. Polygraph, 33(4),234-239. - Arther (1998) as asserted that race can influence the profile of response patterns in polygraph testing, specifically in the cardiovascular recordings. Result: There has been virtually no evidence reported of such effect in polygraphy.

b. Richard Doll, Joseph Law and Chris Piotrowski. (2003). A Literature Review of Cross-Cultural Factors Affecting Polygraph Testing. Polygraph, 32(1), 15-39. - 29 countries including Singapore, Indonesia (Sumatra). Russell, Lewicka and Nitt (1989) and Ekman and Friesen (1986) – the use of question as to whether or not there is a range of emotions common to all cultures. Common agreement (facial expression) to happiness, surprise, sadness, fear, disgust and anger. Fear is associated with deception or polygraph.

3. COMPUTERIZED SCORING OF POLYGRAPH DATA

A critical part of polygraph examination is the analysis and interpretation of the physiological data recorded on polygraph charts. Currently, polygraph examiners rely on their subjective global evaluation of the charts, various partly objective numerical scoring methods, and computerized algorithms for chart scoring, or some combination of the three.

Computerized systems have the potential to reduce bias in the reading of charts and eliminate problems of imperfect inter-rater variability that exist with human scoring. The extent to which they can improve accuracy depends on how one views the appropriateness of using other knowledge available to examiners, such as demographic information, historical background of the subject, and behavioral observations.

Computerized polygraph systems have the potential to perform such tasks as polygraph scoring better and more consistently than human scorers. The two systems: the Computerized Polygraph System (CPS) developed by Scientific Assessment Technologies based on research conducted at the psychology laboratory at the University of Utah, and the PolyScore® algorithms developed at Johns Hopkins University Applied Physics Laboratory.

4. PROBLEM STATEMENT

1. Predictions of counterproductive behavior can be conducted manually by certified polygraph examiner expert relying mainly based on observation of the charts and physical observation of the subject.
2. Automatic predictions of counterproductive behavior can also be produced by computerized polygraph system controlled by certified polygraph examiner expert.

3. Currently, no research has been conducted to compile repository of polygraphic counterproductive behavior and to produce counterproductive index profiling to enable human resource personnel to conduct personnel selection.

4.1 Research Questions

How can polygraph examination charts be translated into polygraphic method for counterproductive behavior index profiling for personnel selection?

4.2 Research Objectives:

1. To study, design and develop a proof-of-concept polygraphic method for counter-productive behavior index profiling system for human resource selection.
2. To build and develop polygraphic repository of counter-productive behavior index profile. This research focuses on the Axciton™ and Lafayette™ polygraph instruments that uses the PolyScore algorithms and development of Polygraphic Counterproductive Behavior Index Profiling System – **POLYDETECT**^{TM}

4.3 System Block Diagram Research Design
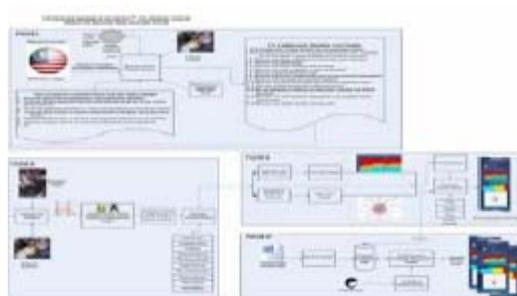
5. PRODUCT DESCRIPTION OF THE RESEARCH

A web-based system integrated to a polygraph testing instrument to assist human resource personnel in profiling perspective candidates for high security risks and high integrity requirement job positions in organizations such as the Anti Corruption Agency (ACA/BPR), Customs, Police, Armed Forces, Security Service companies and Polygraph examiners.

6. RATIONAL

Currently, various tools including Polygraph Testing have been utilized by many organizations all over the world to assist them in the pre-employment selection process to detect possible counter productive behaviors in short-listed candidates. The test is to avoid making the mistake of employing unworthy candidates for high security risks and high integrity based positions. The Polygraph system is basically a psycho-physiological detector that

collects response data from normally three parts of the human anatomy of the subject when asked strategic polygraph test questions. The polygraph tests will result in the generation of polygraph charts that are basically cardiovascular (Electrocardiogram - ECG), respiratory (breathing) and electro-dermal (skin resistance) waveforms patterns**.**

Due to its complexity, the human resource personnel are unable to interpret the polygraph results and require the expertise of certified Polygraph Examiners. Unfortunately, there are not many qualified and certified Polygraph examiners in Malaysia. Hence, there is a need for a computer assisted software application that can assist human resource personnel in interpreting the Polygraph results, detect counter productive behaviors and the profiling of candidates for a pre-employment selection process.

This research project conducted at the Faculty of Computer Science and Information Systems (FSKSM) Universiti Teknologi Malaysia is to study and develop a framework as well as a software application to assist the human resource department in human personnel selection. The system is divided into four phases, namely

i.   Question Formulation
ii   Polygraph Testing
iii Polygraph Index Profiling
iv   Historical Profile Repository .   .

7. POLYGRAPHIC METHOD FOR COUNTERPRODUCTIVE BEHAVIOR INDEX PROFILE SCORES

The data sets from polygraph pre employment testing will used   Johns Hopkins University (JHU)/Applied Physics Laboratory (APL) Polyscore scoring algorithm to score and ranked using scales of 1 to 10 to the answers of the polygraph questions. 10 major areas covered namely alcohol use, computer abuse, credibility, customer service, fundamental data, illegal drug use, sexual harassment, theft propensity, work attitude, and work history.

8. POLYDETECT - KNOWLEDGE PORTAL

POLYDETECT^{TM} - (Polygraphic Counter Productive Behavior Index Profiling System) knowledge portal can be assessed through: **www.polydetect.com**

9. RESEARCH CONTRIBUTION

1. Question formulation based on the Malaysian background following test question construction format and the Multiple Perspective Framework.
2. Utilization of Rank Acquaintance Format to score Counterproductive Behavior Index profile.

3. Develop the Polygraphic method for Counterproductive Behavior Index Profiling system and its repositories.
4. Categories of three main areas of concern. Little/ No Concern (Angel) score of 0-33, Concern (Human) score of 34-55 and Serious Concern (Devil) scores of 56-100.
5. Production of radar charts according to each area of concern which can be the basis of a signature profile.
6. A web-based system called **POLYDETECT**^{TM}
7. A PhD graduate.

10. COMMERCIAL POTENTIAL

Untapped market for tools for human resource profiling system for high security risks and high integrity requirements positions in organizations such as Anti Corruption Agency (BPR), Customs, Police, Armed Forces, Security Service companies and Polygraph examiners.

11. CONCLUSION

Further analysis need to be studied whether the polygraphic method for counterproductive behavior index profiling system built meets all evaluation criteria of the design research information system framework.

The system has been evaluated by polygraph practitioners in Malaysia namely Anti Corruption Agency and Polygraph Science Academy of Malaysia and a Psycholinguist from Faculty of Modern Languages and Communication, Universiti Putra Malaysia.

Further research needs to be undertaken to understand the capability of the system besides further development to enhance its performance. Performance indicators need to be developed while taking into account the issues of relevance and practicality in their application of the system.

LITTLE/NO CONCERN
(ANGEL)

CONCERN (HUMAN)

SERIOUS CONCERN
(DEVIL)
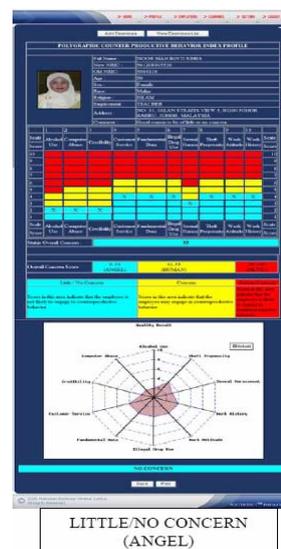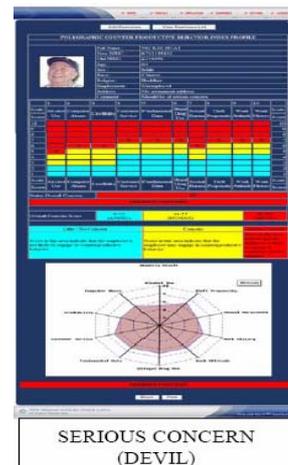
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