

UNIVERSITI TEKNOLOGY MARA

**APPLYING QUALITY FUNCTION
DEPLOYMENT IN THE
DEVELOPMENT OF A FINGER
BASED HAND EXERCISER FOR
COMPUTER APPLICATION**

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ABSTRACT

Conventional product conceptual design is an abstract and creative process but Quality Function Deployment (QFD) is the means for a systematic approach. QFD makes developments be based on customers and the QFD process assures their satisfaction throughout. On a first objective of this research QFD is adopted as a strategy to develop a new hand exerciser of the interactive kind and for the purpose to be able to further contribute in its process domain. QFD helped to acquire knowledge about the product being developed and manage the product development process which in turn product uncertainty and a chaotic product development process is expected or without best practices. Additionally to QFD as known popularly, a process framework is adopted called the Blitz QFD which refines data collection and analysis processes. For a second objective of the research, the interactive hand exerciser is proved technical viable after all request or new knowledge about it is retrieved during objective one. Based on those, this research produced a prototype and have detailed on development tools and solutions. Prototype designs can become stepping stones for better ones in the future for any product developer. On a third objective of the research, initially there was least evident as for it to be desirable or will it be an effective one. Setting out to prove so, as it was a positive indication by the literature, in surveys, none met rejected the idea but provided suggestions for product improvement. In agreement tests, survey population sports student agreed the device would be an interesting hand exerciser or a rehabilitation tool besides all agreed the game is interesting. They need not be realizing it is good exercise but just have fun. For true health benefits, expert physiotherapists were asked for their review and they confirmed it ought to be useful. Some corrections were voiced but for detailed implication collaboration-ship with the experts is a must in future research and development iterations that coming from the engineering department. Though, to make clear on contributions, this research is a QFD case study for a methodological contribution. As an artifact contribution, it entails on development tools and designs for the interactive exerciser. For an empirical contribution, it provides the support for an interactive hand exerciser to be further developed. As a survey contribution, the literature is synthesized for the state of art in both gist; QFD methodology and an interactive hand exerciser.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

The one main program of this research as the title reads is a development of a particular consumer product artifact using best practices. Generally every new research need to the process of planning, evaluation of recent ad-hoc innovation and also to find new options or solutions. Anderson, Ball, Murph & Associates (1976) recommends *evaluation studies* where the assembly of knowledge is emphasized so most existing products today is the working together of different technological advancement from different school. Such a study surely shall become good of use with learning engineers or managers of product development who's education background may come by the aforementioned distinction and whom need better communication. The result are products doubtless designed efficient and effective. Some recent studies that would emphasize on development best practice of multidisciplinary engineered product include Gausemeier, Brandis & Kaiser (2012) and Goldenberg (2013).

Introducing the particular product to be evaluated, hands or fingers which are healthy and strong are very important to personnels whose profession largely depends on them. Endurance capacity in sportsmen or as well as in musicians is what will differentiate them from competing peers and for the job. Today's equipment certainly can help maintaining the best but oftenly stresses out (Molina, 2004). Hence an interactive kind of companion could be the solution. For the best of life, it's a new product awaiting for the solutions to be discovered. Forward, off it's performance characteristic, development of such a device is the *serious games* genre of initiative which goes *a tool that gives player a novel way to interact with games in order to learn skills and knowledge, to promote physical activities, to support social-emotional development, to treat different types of psychological and physical disorders* (Ma, 2011).

Figure 1.1 shows a manufactured artifact intuitive towards the aforesaid new product (Jamal, 2009). A device which fits within grips is operated by the fingers responding