

## **Merging the Research on Halal Concept Using Humanoids for Patient with Brain-Impairment: Its *Maqasid* and Principles**

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### **ABSTRACT**

There is a marked increase in survival rates of traumatic brain injury (TBI) survivors in Malaysia as a result of improved acute health care management. Humanoid robots have been proposed as a therapy option to improving TBI management. Hence, the purpose of this paper is to provide insights on the use of humanoids for augmenting therapy in a brain-impaired individual, particularly the permissibility (halal) of using *Maqasid* principles as a therapy option for TBI. Spirituality and religious interventions will be the main focus of the paper. Data was collected using in-depth interviews with the rehabilitation physicians and therapists as well as via library search, and literature review. Since using humanoid is a new area in rehabilitation, literature on this is scarce, particularly those that are Islamic-based or Islamic oriented. The study also examines the provision of new theories of embodied spirituality relative to humanoids and their perspectives including their impacts on society, ethics, and theological implications of their basic assumptions.

*Keywords:* Brain-impaired, humanoid robots, Islamic perspective, rehabilitation, spiritual

### **INTRODUCTION**

Traumatic brain injury survivors (TBI) due to road traffic accidents has increased (MIROS Road Facts, 2012) due to improved acute health care management (Jamaluddin, Abd Wahab, Wahab, Ming, & Mohd Saiboon, 2011). The rising number of TBI adds burden to not only the survivors but also to their family, community and country as a whole. The rehabilitation of TBI survivors is not new. The approach takes

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on a multidisciplinary team effort, with a continuum of acute care from hospital to the community. No one approach is more superior to the other; hence the services will be dependent on the skills of the attending team and the availability of resources. Many questions regarding the management of TBI are still left unanswered. Gordon et al. (2006) reviewed recent trends in the management of TBI from critical care to community integration, exploring early management, complications of TBI, and outcome of therapeutic models and delivery systems. Many aspects still require preliminary studies and intervention studies for current practices are very much needed (Gordon et al., 2006).

“Halal” is an Arabic word which means “lawful,” or “permissible” under Islamic law. The opposite of halal is “Haram” which means “unlawful”, “prohibited”, and “forbidden”. Halal and haram are universal terms that apply to all facets of life (Sadeeqa, Sarrif, Masood, Saleem, & Atif, 2013). The concept of halal is wider and more comprehensive. Contrary to the popular belief that the word halal is only used in the context of consumables or food products, today it has a wide range of application in the context of inter-relationships, clothing and manner, social and business transaction, trade and financial services to investments or others which are parallel to the guidance specified by Islam (Nasaruddin, Mel, Fuad, Jaswir, & Abd. Hamid, 2012).

The halal guidelines compiled by the Malaysia’s Department of Islamic Development (JAKIM), the country’s

central Islamic authority, are based on Qur’anic interpretations by the Maliki, Hambali, Syafie, and Hanafi sects. In the hadith, the Prophet Muhammad said: “Halal (lawful) is clear and haram (prohibited) is clear; in between these two are certain things which are suspect or *shubha*. Many people may not know whether those items are halal or haram (but) whosoever leaves them, is innocent towards his religion and his conscience”. According to Shafie and Othman (2006), anyone who consumes or involves in any of these suspected items may fall into the area of unlawful and prohibited. This research focuses on the halal concept of health therapy and rehabilitation using humanoids for patients with brain impairments.

The use of technology and assistive devices in rehabilitation has provided exciting new directions in terms of the options and approaches in TBI rehabilitation. Many of the technology look into intelligent devices and environmental modification, assisting those with disabilities. The use of pervasive assistive technology has also created a new scope in monitoring progress, away from the artificial environment of a clinical setting. The true performance of the individual can be assessed by means of functional and purposeful activities, related to ones’ usual activities of daily living, in the environment that he or she lives in (Raskovic, Martin, & Jovanov, 2004). Technology has also expanded beyond monitoring and compensating for the impairment. Its use in therapeutic activities to restore a loss function or maximise the

recovery of function has led to an area of great research interest. One of these areas of interest is in Rehabilitation Robotics. Rehabilitation Robot System proposed by Yakub, Md. Khudzari and Mori (2014) is divided into two main categories: (1) Therapy Robots; and (2) Assistive Robots. Therapy Robots can be subdivided into Physical Therapy and Emotional Therapy. Physical Therapy robots are typically exoskeletal orthotic devices that deal with the upper, lower or full extremities. The authors further describe the assistive robots as either Social Interaction Robots or Physical Interaction Robots.

Zafonte (2006) had earlier described social robots as a potential area in Biotechnology research for TBI rehabilitation. According to him, the assistive technology, such as the “helper robot”, may act as a social interaction and physical interaction robot. Helper robots or social robots may take on the form of a machine-like device, such as the auto vacuum or human-like robots, i.e., humanoids. In terms of therapy, humanoid robots are less well studied as compared to its counterpart, the exoskeletal devices. Although Yakub, Md. Khudzari and Mori (2014) described this category of Rehabilitation Robot System under “Emotional Therapy”, we would like to address it in a wider perspective as “Cognitive Therapy” Rehabilitation Robot System. The cognitive rehabilitation aimed at the learning or relearning of new or lost skills after TBI is imperative in the success of a rehabilitation programme. Humanoids in this sense benefit cognitive-

impaired individuals, especially those with development disabilities as a result of brain injury (Malik, Yussof, Hanapiah, Rahman, & Basri, 2015). The field of Epigenetic Robotics or Developmental Robotics has contributed, in synergy, to the studies of understanding the model of both typical and atypical developing children (Prince & Gogate, 2007). This has also proven to be true for understanding and developing better robots. The use of humanoids in TBI may help us further understand this complex injury and at the same time encourage further development of autonomous machines, modelling Epigenetic Robotics for use in cognitive therapy.

## METHODS

This is a qualitative study and empirical data was collected using in-depth interviews with rehabilitation therapists, library search and literature review of earlier studies on this topic. In addition, interactions between the children with brain-impairment and the humanoid robots were observed. The observations were carried out in collaboration with UiTM Specialist Medical Centre, Discipline of Rehabilitation Medicine, Faculty of Medicine, UiTM Sungai Buloh and Faculty of Mechanical Engineering, UiTM, Shah Alam. An approval was obtained from UiTM Medical Ethics Committee.

## RESULTS AND DISCUSSION

Many TBI patients have attention deficit (Anderson et al., 2012). The attractiveness of humanoid is in its potential to create the

attention needed during therapy. Although few studies have looked into the effect of attention improvement in TBI after exposure to mobile robots, the most benefits were seen among autistic children (Duquette, Mercier, & Michaud, 2006). Humanoids, such as NAO, are now available in the market and are used for both typical and atypical developing children. Studies on the initial response of children with autism are promising. Hashim et al. (2013) and Shamsuddin et al. (2012) looked at the potential behavioural and cognitive changes associated with a single exposure to the humanoid robot NAO.

The set scenario of a humanoid robot during therapy can be programmed based on the capacity of the TBI individual. As the individual recovers, the complexity of the scenarios can be advanced to higher levels of cognition to incorporate complex executive functions. The present study hypothesises that use of humanoid robots will augment and assist the recovery of TBI patients. These improvements will be translated to cognitive improvement, and the patients will eventually be weaned off clinical therapy and moved to community-based rehabilitation and reintegration. Malik, Hanapiah, Abdul Rahman and Yussof (2016) looked at recent trends in use of Social Assistive Robots for therapy by examining 12 studies that looked at the potential use of social robots as an augment to conventional therapy for children with cerebral palsy. They concluded that social robots, as social assistive robots, have

potential. However, most of the studies they reviewed were small, conceptual and lacked clinical outcome assessment.

Engagement is closely related to attention and purposeful activities, and the answer may be the humanoid robot. Studies have shown that engagement and purposeful activities during therapy are important components of the rehabilitation programme. The creation of a predictable and simple environment, in which a humanoid robot can provide, will help with engagement. Many TBI individuals are overwhelmed with the complexity of the environment, unable to process all the information around them. When complexity is overwhelming, individuals with TBI may become restless and agitated. This might cause them to withdraw from therapy sessions. This is often a stumbling block in the progress of the programme and recovery.

The question posed by many regarding the use of humanoid robots in the brain-impaired is not only its effectiveness but also its permissibility in Islam as an inanimate object of human resemblance. According to Ayad (2013, pp. 25-31) the holistic approach in health is not only to ensure the absence of illness, but also the balance between physical health, biochemical health (nutrition and environment), intellectual health (conscious and subconscious mind), emotional health and spiritual health (food for the soul). This paper will further discuss the aspect of spirituality and religiosity in the use of humanoid robots in the augmentation of therapy.

### **Maqasid Shariah and Islamic Principles on Humanoid Therapy**

*Maqasid Shariah* refers to the objective of shariah to ensure welfare to mankind. There are five basic intents of *shariah*, namely preservation of religion, life, progeny, intellect and wealth. Health care in general, or in this particular study treating patients with brain impairment with the assistance of humanoids, seems to be intricately associated with the preservation of both progeny and intellect. Hence, to treat a patient through medication and therapy is a subject matter inseparable from *shariah* and its *maqasid*. In the *Qur'an*, Allah said: "He has only forbidden you what dies of itself, and blood, and flesh of swine, and that over which any other (name) than (that of) Allah has been invoked; but whosoever is driven to necessity, not desiring, nor exceeding the limit, no sin shall be upon him; surely Allah is Forgiving, Merciful". (Al-Baqarah: 173)

In order to preserve the five basic intents, it should be done by following the Islamic Principles. Muslims should find ways to heal their sickness, then only they should leave to God to grant them with cure (Al-Jauziyah, 2010, pp. 30-34). The statement "the ends justify the means" is not practised in Islam. From an Islamic perspective, the decisions on the actions to be taken to achieve a particular objective must always be based on the Islamic Principles. Siti Fatahiyah and Rukiah (2010, pp. 9-11) found that in aspects related to medicine, there are six major principles to be followed. These six major principles are:

- (1) The treatment goes in line with the teachings of Islam.
- (2) The treatment is based on the Islamic Legal Maxims.
- (3) The treatment focuses on the prevention and cure (*al-wiqayah*).
- (4) Avoid doing destructions (*sad al-zarai'*).
- (5) Believe in the power of Allah to cure every illness.
- (6) Use an unlimited method of treatment which is *shariah*-compliant.

### **Islamic Legal Maxims Application**

*Shariah* can be observed and practised by Muslims wherever they go. If there are unavoidable constraints, however, it is permissible for Muslims to not observe *shariah* (Muda & Ali, 2000, p. 139). Islamic Legal Maxims are the guided rules and regulations to be fulfilled in order to measure the significance of implementing certain actions. The maxims consist of the following:

- (1) Matters shall be judged by their objectives (*al-Umur Bi Maqasidiha*).
- (2) Certainty shall not be removed by doubt (*al-Yaqin La Yuzal Bi Al-Syak*).
- (3) Hardship shall bring alleviation (*al-Masyaqqah tajlibu Al-Taisir*).
- (4) Harm shall be removed (*al-Darar Yuzal*).
- (5) Cultural usage shall have the weight of law (*al-'Adah muhakkamah*).

Generally, the making of robot falls under the ruling of image making. If the robot resembles exactly the shape of a man or any animate being with the purpose to be worshipped or adored without any urgency, it is prohibited in Islam. It is associated with the action of imitating Allah's creation. "Give life to that which you have created." It also comes with the words of the Prophet (peace and blessings of Allah be upon him): "Those who will be most severely punished on the Day of Resurrection will be the image-makers." (Narrated by al-Bukhaari, no. 5606; Muslim, 2109). In addition, the establishment of guidelines along with supporting argument in the presence of acceptable excuse: (what is allowed and not allowed) due to the acceptable excuse with the presence of the reasons in order to making it or leaving it. *Maqasid Shariah* consists of: (i) urgency (*ad-dharuriyyat*): guaranteeing their 'vital needs; (ii) necessity (*al-hajiyat*): catering for their 'requirements; and (iii) additional facilities (*at-tahsiniyyat*): allowing for 'betterment', enhancement or improvements (*tahsiiniyyaat*) in the quality of their life. Thus, the use of humanoids falls under the level of urgency because the brain-impaired individual has to undergo intervention and rehabilitation. This fulfils the requirement of *Maqasid Shariah*'s five basic intents.

There are some controversial questions among religious scholars and academicians/clinicians on the use of humanoid robots for therapy and intervention in the brain-injured, and on whether there are options for better modes of intervention. At this

point, the weight of finding solutions and reducing the burden of brain injury is greater. Graves, Rivara and Vavilala (2015) estimated that the average cost of paediatric severe traumatic brain injury at one-year post injury to be averaged at USD38,586.00 per child. Lifetime costs obviously are greater when we look at the aspects of not only the hospital care, but also the costs of social care (education and housing), and the long-term costs of productivity (loss of carers needing to leave the workforce, or the injured not being able to enter the job market). A multidisciplinary and multimodal approach needs to be applied for better care of the brain-injured. This study has proven humanoid robots are able to provide a good outcome.

## CONCLUSION AND SUGGESTIONS

It is clear that the humanoid robots are not made to replace humans or healthcare professionals in providing therapy and care. The humanoids are merely an augmentation of therapy, providing a new approach in increasing awareness, attention, and participation of the brain-impaired. The features of the humanoid are inclined towards simplicity and are necessary to help process information during learning and rehabilitation. Without this aid, the brain-impaired may face further and unnecessary hardships. The objective is clear during the intervention (to seek cure) and Al-Su'aidan (2007, p. 338) elaborates that the method should cause no harm or destruction. However, many of the studies looking at the effects of intervention with

humanoids are small, conceptual and poorly measured. When these factors are weighed in from the perspective of Islamic principles and legal maxims, justified uses of the humanoid may be questioned. Nevertheless, in looking at the potential use, the evidence is there. Researchers need to embark on larger and better-designed studies with irrefutable clinical outcome measures and results. The function of the humanoids is now still far from automaticity. At this time, it still requires the operator or the human programmer and therapist to run the session. No known existing robot can emulate the complex human brain and function to become fully automatic (artificial intelligence). As to date, the robots used in therapy are still manually operated. Hence, the idea of a fully automated and an artificially intelligent humanoid should not be the researchers' main concern. The non-animacy is best maintained, including the features of the humanoid to resemble but not to fully replicate that of the human being. Studies have also shown that the full replication of human features appears to be non-beneficial for therapy and intervention, to the extent that it can, in fact, cause harm by instilling fear. Further studies should be conducted to create spiritual modules or scenario designed to programme the humanoid robots to comply with the legal maxim of "certainty shall not be removed by doubt", as applied to this new area of research and intervention.

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