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Man vs Robots? Future Challenges and Opportunities within Artificial Intelligence (AI) Health Care Education Model

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ABSTRACT: This study investigated the need to provide a formal artificial intelligence (AI) health care education model to the 21th century AI health care learners. Health care has continuously transformed at all levels of health care-administrative, operational, and practical. This vastly changing health care industry requires a synthesis of communicating multifaceted and diverse forms of thinking. AI health care professional entities within business, technology, art, biomedical, and other health care related sectors must work cross-functionally to establish roles that will meet the need toward improving health care at all levels. In order to achieve this pursuit, we researched and investigated how to create an AI health care education model fostering collaboration and innovation. There has been a significant calling for AI heath care collaboration of academicians, clinical scientist, and health care practitioners of all levels to identify a comprehensive AI health care education model due to the current void in the health care course design. To further this empirical study, the researchers focused on a qualitative study comprising of qualitative interviews and surveys inviting participants from the AI health care, business, biomedical, clinical scientist, academia, and capital investors to expound on the level of significance each professional sector have toward AI Health care education.
KEYWORDS: Health Care technology solutions, Health care Technology solutions education, Incubator Clinical Hours, Emergence AI Curriculum Design Model.

Introduction

Health care has continuously transformed at all levels- hospital chains, medical technology facilities, pharmaceutical supply chains, and 911 emergency systems (The Medical Futurist 2017). This vastly changing health care industry requires a synthesis of communicating multifaceted and diverse forms of thinking (Buller, Cuddihy, Davis, Doherty, Doshi-Velez, Erdem, and Fisher 2011, 119-127; Ramesh, Kambhampati, Monson, and Drew 2004, 334-338). AI health care professionals expand within business, technology, art, biomedical, and other health care related sectors hoping to become more patient centric and to reduce global health disparities (Holliman, Douglas, and Chassity 2014; Khazaei 2016; Troy, Carson, Vanderbeek, and Hutton 2007, 14-165). Systematically, all health care professionals must work cross-functionally to establish roles that will meet the need toward improving all levels of health care (Holliman Douglas, and Chassity. 2014; Troy, Carson, Vanderbeek and Hutton 2007, 14-165). Moreover, having a unified education model can assist with community based disaster preparedness and global health care related issues (Skilton 2011; The Medical Futurist 2017; Williams 2010). As the health care industry evolves into a patient centric delivery model, AI health care will be required to create a sustainable and error proof learning system. In this paper, this research team will (1) provide a comprehensive overview of AI health care, (2) recognize the pioneers that revolutionized AI health care, (3) explain how AI health care is being modernly approached, (4) identify the future approach to AI health care, and (5) provide the AI heath care-learning tool.

There is an opportunity to challenge how health care educators are approaching AI health care that focuses on patient centric health care models (Cohen 2014; Wertheimer and Thomas 2003). Establishing an AI health care learning model will incorporate tools and essentials required to educate health care professionals. Data will be collected from a diverse cross-functional population that will explain the current void in today's health care learning model. The following sections present, describe, review, and endorse the evaluated works according to the data collection and an explorative analysis of a comprehensive AI health care education course.

Understanding Artificial Intelligence

According to Berkeley n.d., AI is a technology that utilizes machine intelligence and human like rational ability to process through historical and instantaneous data to make forecasts, suggestions, recommendations, and determinations. AI is not a lone technology but a junction of numerous technologies, statistical models, algorithms, and methods (Cx - Center of Excellence for Artificial Intelligence AG 2017; Newell and Simon 1976, 113-126; Science & Technology 2011, 96). AI health care is a division of computer science that is able to analyze compound medical data (Rocha 2015; Ved 2010). AI health care has the ability to create programmable agents and relationships that can mimic the human brain that will diagnose, treat, and predict outcomes in many clinical settings (Russell and Norvig 1995, 27; Science & Technology 2011, 96). This dynamic and evolving capability will continue to emerge and enhance the artificial human brain to continue creating intelligent systems.

Much of today's AI health care intelligent systems are owed to key pioneers and creators. John McCarthy, a legendary computer scientist, is the founding father of Artificial Intelligence who coined the term in 1955 (Computer History 2017). Other key pioneers include but are not limited to, McCulloch and Pitts (1943) who invented the first AI health care neurone using simple binary threshold functions (Cross 1999, 146; Russell and Norvig 1995, 27). Rosenblatt (1958), a psychologist who developed the Perceptron as a practical model that is used widely today to analyze artificial neural networks, which is the most popular AI technique in today's medicine (Ramesh, Kambhampati, Monson, and Drew 2004, 334-338). Additionally, acknowledgement is owed to Werbos (1974); a doctoral student who introduced backpropagation learning that transformed popular network designs that later developed the Radical Basis Function and the Self Organizing Feature Map (Elanayar and Yung 1994, 594).

With owed respect and appreciation for the founding fathers and pioneers, their work birthed the conception of AI health care technology corporations to further the contribution toward modern day medical. According to The Medical Futurist 2017, virtual reality brain surgery was performed for the first time in the Royal London Hospital. Also, AI health care technology has made strides to develop a placenta-on-chip to predict neonatal disease by mimicking a microenvironment of the maternal-fetal interface (The Medical Futurist 2017). Although, these are a few AI health care advancements, these advancements reveal that artificial intelligence has begun to redesign the health care platform. High tech companies such as Google, Oracle, IBM, and Johnson & Johnson are developing new technology toward early cancer detections and treating pre-existing health conditions (Nix 2014; The Medical Futurist 2017).

AI health care is growing exponentially as health care is rising to treat our global population (Troy, Carson, Vanderbeek, and Hutton 2008, 149). There is a demand to reduce inpatient services and early detection of chronic health issues (Adams, William, Snow, and Helmick 1998, 60). Along with future health care concerns such as rising insurance cost to reaching disaster stricken communities, educators must provide a holistic education model for all disciplines.

Determining a Road to Increase the Artificial Intelligence Workforce

As the global economic crisis lingers, the ability to withstand the United States' position as a leader in research and development is a significant concern of policy makers. As given by (Landivar 2013, 1-25), academic leaders, government, and industry are stating the need for a significant increase in the workforce in particular to science, technology, engineering, and mathematics (STEM). Also, a more diverse workforce is needed in science, technology, engineering, and mathematics (Goings, Mitchell, and Hilton 2016, 102-106) because the STEM workforce and STEM faculty positions are filled predominately with white men (National Science Foundation (NSF) 2013, 13-304).

Strikingly, the representation of STEM jobs was "6.2 percent" (Bureau of Labor Statistics, 2016, STEM Occupations) of the total jobs representing US employment. This "6.2 percent" (Bureau of Labor Statistics, 2016, STEM occupations) is roughly "8.6 million" in (STEM) jobs. Increasing the number of students pursuing degrees in STEM (science, technology, engineering, and mathematics), requires enhanced mathematics and science education. A key concept is to increase the number of K-12 students with strong proficiencies in math and science. If the students are able to gain strong proficiencies in math and science early, and this knowledge is nurtured up through high school graduation, the result could be a substantial increase in the number of high school students choosing STEM majors (Boccio, 2016; White 2018, 25-48).

STEM Theory for K-8 Supporting Artificial Intelligence

Driving artificial intelligence requires an all-out education STEM learning model in grades K-12. This learning model requires more than stating that students need to be educated; faculty members and administrators have to be a part of this lineup (Guo, and Anderson 2005, 12-20). The curriculums must be documented with specifics

about how to educate students to understand STEM. Schools are filled with a diverse population of students. Some of these students began with a disadvantage of not being able to speak the primary language spoken in the school. According Byrd, 2016, 10-21 there is a need to understand the racial climate and experiences, multicultural education coursework, and program restructuring. There has to be teachers and administrators in the schools who understand the school's climate, and student population, and can get the students to respond positively (Bottiani, Bradshaw, and Mendelson 2016, 1176-1191; Cohen 2014).

In order for schools to thrive, there must be a need to move from schools with a below standards performance score. The question is, should teachers continue to teach to the different standardized test to achieve a passing score or should information be taught to encourage critical thinking toward problem solving. This research team offers that the student population and learning has to come first; also, administrators and teachers must be –reeducated to meet the students' needs in order for the United Stated to thrive in AI, a STEM study.

STEM Theory for Higher Education

Knowledge, skill, and ability must be consistently gained from grades K-8 in order to master the compounding skills required in grades 9-12. Such skills include AI as a part of the STEM program. Educational edifices are implementing mobile and educational technology strategies that include educational technologies (Burton, Harris, Burrell, Brown-Jackson, Bessette, McClintock, Lu, and White 2015, 284-309). These changes in mobile and technology strategy should be disseminating down to students in an effort to make them more prepared for education through technology and more exposed to education outside of the classroom. If implemented appropriately, these changes should support students to learn better in the classroom. Maida (2017) quoted Jhansi Mary of Techvavio, "The artificial intelligence market in the US education sector is expected to grow at a spectacular CAGR of more than 47%. The US education system is the pioneer in implementing education technology solutions with the objective to improve the quality of education imparted to students and consequently the graduation rates. Therefore, many public and private educational institutions in the U.S. are investing large resources in implementing the digitization of education."

Digitization of education seems to be simple, reviewing what this could mean for higher education is critical. Gaming station and mobile technologies (e.g., iPads, smartphones, and social media) are a part of the tools and technologies that are making classrooms and incubator environments more encompassing with being able to work with, review more materials as well as converse, and share with more people. Presently students are in a world that is ubiquitously linked through technology with knowledge outside classrooms, and incubator laboratories. Faculty members and students are using some form of mobile technology; therefore, traditional methods of education are not as robust as what technology systems can offer (Aymerich-Franch 2015, 1-24). The school of thought exists that the reengineering of the education system will not occur until all academic facilities are digitized; therefore; students can learn at their own pace within and outside the classroom. While this concept is mentioned here, it will not be expounded upon until 'at their own pace' takes on a new level of research. Their learning increases while they foster mentorship and direction from educators.

AI should not be viewed as a stand-a-lone field, on the contrary, it should be viewed in the framework of the Third Industrial Revolution, the age of information processing and computers, that has led to economic and information globalization. To ensure knowledge, skills, and abilities, institutions of higher learning should employ incubator laboratories wherein students have to produce models. A difference is that instructors must be engaged in the learning process with the students. Pedagogical grandstanding without demonstrations and hands-on approaches can no longer be accepted in education. Andragogical principles (i.e., self-directedness, need to know, use of experience, readiness to learn, orientation to learning, and internal motivation) should be included to help ensure student engagement (Hagen & Park 2016, 171-190). Colleges and Universities must graduate students who can produce; graduating with just concepts is no longer the answer.

Post-Graduation

AI is at the soul of much of today's technical innovation; therefore, AI graduates will need to remain engaged in the rapid changes of the field. Graduates will need to stay engaged in workshops and courses to remain abreast of the changes. According to Rainie and Anderson (2017), as robotics, automation, and artificial intelligence are used to perform more and more tasks, and this work leads to substantial interruption of jobs, more STEM education and skills-building programs will be in demand. Individuals who have been in the workforce for some time and are in jobs that may

be replaced by technological innovation should seek new knowledge, skills, and ability in STEM to include AI. Becoming stuck in a losing situation due to technological shifts does not have to occur. These workers may want to reassess their values and priorities regarding work.

Conclusion

Automation is taking the place of labor in numerous industries across the entire economy. The number of workers who will be displaced, as well as the number of positions to be displaced are yet to be understood. The idea is to be prepared for change, as the benefits of AI are considerable, a thriving field which is still greatly unimagined. It is unmistakably and explicitly clear; there has never been a better time to study AI. AI is positioned to influence the world of computing for the better due to the need and requirement for sharper solutions to all concerns, blended with compounding access to high performance computing and a profusion of abounding data sources.

Originality in AI is no longer restricted to revered academic laboratories, but is occurring in private research facilities. AI is affecting fields such as healthcare; customer service; education; manufacturing; finance; transportation as well as the automobile industry. Technology is changing the manner in that the citizenry envisions technology to perform. Examples of this technology on personal activities are Apple's Siri, and Microsoft's Cortana, which are considered welcoming, dependable, and proficient.

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