International Book Chapter - ISBN: 978-623-09-7870-8

CHAPTER VIII

Teaching and Learning in an AI World: A Relevant Model of Catholic Education

Angelo Luciani Moa Dosi Woda
(angelo.woda@stikassantoyohanes.ac.id)
STIKAS St. Yohanes Salib – West Kalimantan

Abstract

This paper explains important tactics that AI developers and users must carry out to have fair and inclusive ethics. The method is to encourage the formation of collaboration between scientists and theologians, as well as restructuring educational curricula and learning environments that are humanistic and reflective. A strong and wise generation will be formed by Catholic education as long as it prioritizes human dignity and maintains a balance between technology and moral ethics. Integrated supervision in applying ethical AI concepts in practice and evaluating the impact on spiritual growth and religious understanding. Catholic education continues to struggle to integrate the values of the Catholic faith to be relevant in facing the challenges of AI technology, which continues to develop rapidly. This paper aims to develop a Catholic education paradigm based on change that can adapt to the AI era.

Keywords: Artificial Intelligence (AI), Catholic Education, Faith Values, Curriculum, Learning Environment

Introduction

The application of artificial intelligence (AI) technology in learning is increasingly popular. AI is utilized for many things in all aspects of life, from simple machine learning to automation and feedback systems. However, although there are many benefits, they also have many disadvantages, such as dependence on technology, reduced connectedness or relationships between people, and the emergence of concerns about algorithmic bias (Brown, 2022; Smith, 2021). To build harmony and balance between technical effectiveness and efficiency with human values, it is very important to integrate AI into Catholic education.

Snelson (2021) concludes that the massive and extensive use of AI in the world of education, and with its applications including the student tutoring process, requires personalized education and an adaptive learning system. However, educators must be careful about the emergence of potential negative or bad impacts, such as the dehumanization of students during the educational process (Fjeld et al., 2021).

This problem becomes increasingly complicated in education that is based on religion, especially Catholicism, which requires integration with Catholic religious principles. The Catholic Catechism (CCC, 1997, 2331) strongly emphasizes that scientific and technological progress must be in line with and by human dignity, created in the "Image of God". Therefore, the Catholic education model which includes elements of the latest technology, especially AI technology, must remain faithful to the core principles of Christianity, which is very much needed.

This paper uses a literature study that analyzes various secondary sources, including Catholic philosophical theology and official Catholic Church references, such as encyclicals and papal statements. Secondary references such as books, research articles, and publications of scientific articles about education, artificial intelligence, and the application of Catholic religious principles make important information. The question is how to use artificial intelligence (AI) aligned with Catholic teachings into Catholic education to create a model of Catholic education relevant to the modern world.

Literature Review

The Role of Education in the Context of the Catholic Church

Since the time of the Apostles until now,, education in the Catholic tradition has been a crucial part of the Church's mission. As stated in the Second Vatican Council's decree (Gravissimum Educationis, 1965), the main goals of Catholic education are to help people become humanly perfect and to promote unity with God in their lives. In 1979, Pope John Paul II emphasized the Church's teaching role in the context of the Christian religion (Catechesi Tradendae). In Catholic education, St. Augustine also highlighted the inseparability of faith and reason (Moran, 2011). This idea is further supported by the Catechism of the Catholic Church (CCC 1997, 2339), which emphasizes the significance of education in assisting people in realizing their mission as God's children.

The Catholic Church views education as a component of soul sanctification and purification, and its commitment to education is theologically based on the Holy Trinity (Rummery, 1975). Integrative humanism in Catholic education is founded on the works of Catholic philosophers such as Jacques Maritain and Thomas Aquinas (Elias, 2002). They contend that character development and spiritual growth are equally important aspects of education in addition to intellectual advancement.

In this sense, Catholic education prepares students for both this life and the next by forming them holistically and going beyond the mere transfer of knowledge. The Catholic curriculum, which covers the study of religion, ethics, and morals, clearly demonstrates this all-encompassing approach. Catholic education places greater emphasis and focus on justice and social service, as exemplified by Christ's love for fellow humans (Sinibaldi et al., 2020).

In Church teachings and Christian ideals, Catholic education is used as a medium to guide humans toward complete and perfect success in their relationship with God. To achieve educational goals in the Catholic tradition, the approach used is to integrate and increase knowledge through the development of character, faith, reason, theology, and philosophy.

Digital Transformation in Education

Advances in artificial intelligence (AI) technology have changed the world of education, and a new learning paradigm has even emerged from traditional to digital transformation that includes AI in several learning domains. According to McKinsey, AI technology has been widely used and utilized in the world of education. The material is adapted to an intelligent tutoring system (Henke et al., 2021). The application of artificial intelligence (AI) in the classroom can speed up the learning process by up to 30% and increase student engagement by up to 60%.

However, there are risks in using AI in education, namely the risk of excessive dependence on machines, where the human role becomes weak or decreased in the learning process, and the existence of algorithmic bias as explained by Fjeld et al. (2021). UNESCO (2019) explains that the use of AI in education must focus and concentrate on pedagogy that can strengthen students' capacities in empathy, creativity and interpersonal relationships. Therefore, it is very important to determine cooperative and adaptive strategies in combining

human characteristics with the advantages of AI technology (Zawacki-Richter et al., 2019).

Pope Francis warned of the potential risks that arise with advances in AI technology that do not pay attention to and provide opportunities for humanity. In Pope Francis' encyclical in 2015, Laudato Si was created. Thus, the Catholic education process and the digital transformation process need to be aligned with the vision of humanism, which emphasizes the existence of essential human values because humans are created in the image and likeness of God.

In using AI technology, Catholic education prioritizes morals and ethical principles. This ensures that the use of AI must support teaching that emphasizes character development, service, and holistic individual growth. This is by the teachings of the Catholic Church regarding the importance of complete individual development, including spiritual, intellectual, emotional, and social aspects. Thus, to prevent uncontrolled technological innovation and damage to human values, the core goal of Catholic education must be to integrate AI technology in a wise, harmonious, and balanced way.

Integration of Catholic Values in AI Learning

An important component in maintaining the traditional and intellectual roots of Catholic education is the integration of religious principles. According to Pimmel (2021), the practical implementation of this integration requires the integration of AI and digital literacy with religious education using an interdisciplinary approach. This method protects the basic principles of Catholic education even though contemporary technology is widely used.

As explained by Stringer (2021), there are several difficulties in integrating religious values in Catholic education in this AI era. There are many factors that cause this, including problems with a lack of references and limited skills of Catholic teachers in dealing with AI technology which is developing rapidly. Williams (2021) describes new developments in AI, offering new opportunities to enhance modern spirituality in Catholic education.

The Second Vatican Council emphasized the need for Catholics not to be technologically illiterate and to actively participate in creating a religion-based curriculum that is relevant to modern society (Gaudium et Spes, 1965). This emphasizes how science and religion must work together to create a skilled

Catholic education capable of combining the principles of faith with developments in AI technology.

Several approaches to incorporating AI in Catholic education have been carried out and implemented, such as the use of chatbots for religious counseling (Wagland et al., 2021), in an effort to provide pastoral care for students that is easily accessible. The online counseling AI platform was proven to implement Catholic ideals in a case study conducted at St. Mary's High School (Lee, 2020). This platform was created to show compassion in interactions between teachers and students personally, and guide based on Catholic religious values according to students' needs.

The results show that counseling with technology can be effectively implemented without replacing professional counselors. Apart from that, efforts to make Catholic education more dynamic and attractive to the younger generation are carried out by creating virtual reality simulation games that combine Catholic doctrine and history (Baeck et al., 2021). Furthermore, to reduce concerns and fears regarding the moral application of AI technology in education, Jobin et al. (2019) developed the Ethics AI module, which develops the ethical principles of artificial intelligence. Therefore, a holistic collaborative effort, including with various stakeholders, teachers, technology developers, and religious authorities, must synchronize and integrate the principles of faith with AI technology in Catholic education. By doing this, Catholic education remains relevant and in line with the needs of the modern world.

Discussion

Ethics in the Development and Use of AI

Artificial intelligence (AI) is developed and implemented within a Catholic ethical framework based on core values. The Vatican-backed declaration includes six ethical principles that should guide the development of artificial intelligence. The six declarations are:

1. Transparency, AI systems must be understandable by everyone.
2. Inclusion, this system must not discriminate against anyone because every human being has the same dignity.
3. Accountability, this system must always have someone responsible for what the machine does.
4. Impartiality, AI systems must not follow or create bias.

5. Reliability, AI systems must be reliable.
6. Security and Privacy, this system must be secure and respect user privacy.

The text of the declaration is very universal in relation to Human Rights, pointing to the equal dignity and rights of all humans, which AI must protect and guarantee, while calling for equality for the benefit of humanity and the environment. The declaration also provides several concrete recommendations such as people should be alert when they interact with machines; that AI-based technologies should be used for empowerment, not exploitation; and that AI must be used to protect the planet.

The values declared by the Pope are a dedication to openness and public responsibility (Pope Francis, 2021). The Catholic Church has consistently supported the idea of favoring the poor and preferring charity to corporate profits. In education (John Paulus II, 1987) emphasized the need for empowerment and equal educational opportunities for everyone or inclusion, especially for people with low financial capabilities. Therefore, empowerment of students and society is a top priority when integrating and implementing AI technology into education.

Rai et al. (2022) put forward an approach called relational AI which prioritizes personalization and augmentation as opposed to automation and



dedication to helping and serving others. With the creation of chatbots designed for pastoral counseling with empathy and virtual reality simulation, which emphasizes sincere interpersonal interaction and communication and increases spiritual appreciation. This means that Catholic ethical norms are incorporated into the creation and use of AI technology in education, and this requires a holistic approach that includes active involvement of all parties and a clear understanding of the moral and social implications of AI technology.

MAN is the image of God (cf. Gen. 1:27). He has abilities that exceed other creatures in the world so he is asked to care for and manage the world (cf. Gen. 1:28-30). As creatures, humans have intelligence that can be creative for the progress of human civilization. And since ancient times, humans have developed technology to help their work entrusted to them by God.

From time to time, people never stop trying to make their lives easier so that everything they do becomes easier. Of course, in this era humans are working on

artificial intelligence or Artificial Intelligence (AI) basically not to replace humans but to help humans as is the goal of all technology.

Character Building and Priesthood in AI Learning

Today, artificial intelligence is experiencing recent developments from tools like ChatGPT, Midjourney and Google's Bard raising many doubts about what it all means. In the world of Catholic education, AI is looking to change the academic landscape, and for educators, the AI wave is seen as a mystery or a threat or both. According to Melissa York, a mathematics teacher at Notre Dame Preparatory School in Pontiac, the incredible popularity of AI will continue to be a boon for schools that is full of positive things for both teachers and students.

The opportunities that AI brings to education are vast and the potential to revolutionize the way educators teach and students learn is nearly limitless. These opportunities include personalized learning, increased efficiency, increased student engagement, increased accessibility, and predictive analytics.

In the context of Catholicism, the Church does not reject the presence of AI in human civilization. AI is a human work so it has value and benefits for humans if used rationally. The Church positions itself to provide support for technological developments that are beneficial to humanity.

The Church is grateful that humans have special abilities so that humans are increasingly developing from time to time, however, the Church is aware that everything that humans discover is sometimes not used well and correctly or placed incorrectly, for example the discovery of firearms which were not used properly when they were circulated. It is not regulated properly so that repeatedly there is inappropriate use of this technology which causes fatalities among school children.

It is hoped that the existence of AI for human life will not disturb and reduce humans even though many human jobs have shifted to automation technology. So several things that need to be considered are related to the moral principles regarding the use of AI, which requires prioritizing respect for human dignity. This means that the Church supports the use of AI in human life but users need to pay attention that its use cannot be in conflict with humans themselves.

Users maintain that AI is used properly for useful human life and work, not for counter-production which is not beneficial for human life. The Church rejects that when AI is used for automatic weapons that kill human life, AI can be

mistaken in its use because AI is not a human who has a mind and soul that cannot make judgments about good and bad actions.

Catholic education can encourage thoughtful thinking and dialogue regarding the use of AI, this can be achieved by implementing appropriate strategies such as alumni-based mentoring (Berg et al. 2022). Through this strategy, students can understand the consequences of life and connect the principles of the Catholic faith with the application of AI knowledge. Sgreccia (2021) highlights the importance of AI in personalized and adaptive planning.

Catholic Teachings in the Context of AI Learning

AI has made significant progress in transforming education, but there are still several technological limitations, including:

1. Contextual Understanding, AI systems struggle with contextual understanding and are often less able to understand language nuances and meaning.
2. Adaptive Learning, personalized and adaptive learning is an area where AI has great potential, but significant progress is still needed.
3. Ethical Decision Making, AI ethical considerations are very important in the educational environment such as being transparent, fair, and impartial, especially when making decisions regarding student performance, assessments, or career recommendations.
4. Creativity and critical thinking, AI promises to automate certain tasks, but still fails to develop creativity and critical thinking skills.
5. Emotional Intelligence, AI lacks emotional intelligence, making it difficult to understand and respond appropriately to students' emotional states, such as frustration, confusion, or boredom.
6. Limited contextualization, AI-based educational platforms focus on specific subjects or tasks, thereby limiting students' ability to provide a comprehensive and holistic educational experience.
7. Lack of human interaction, although AI automates certain tasks and provides personalized instructions, it cannot completely replace the benefits of human interaction in the learning process.

Based on the limitations above, it is important to integrate Catholic values into AI learning in curriculum design. The core principles of Catholic teaching about human dignity, namely personalization, human uniqueness, empathy, and

interpretation, are emphasized in learning design. Additionally, humanistic and collaborative AI models must be consistent with Catholic religious viewpoints.

AI curriculum design can incorporate techniques to create a reflective learning environment. This can include setting up digital and physical areas for introspection, creating digital environments that mimic worship and spiritual experiences, and creating activities—such as journaling or chatbot-assisted spiritual audio guides—that encourage quiet moments and introspective encounters with God (Pham et al., 2021). A case study conducted at the University of Notre Dame shows the effectiveness of spiritual application in shaping student character (Seery & Donnelly, 2022).

Catholic educational institutions can guarantee that the AI education offered remains firmly rooted in the authentic values of the faith and enhances the spiritual growth of students by incorporating Catholic values and Church teaching principles into the AI curriculum design and fostering a contemplative learning environment.

Upholding human uniqueness as an image of God (imago Dei), placing humans above machine efficiency, tailoring personalization based on individual interests and learning styles, and recognizing the subjectivity of interpretation and the importance of two-way human-AI interactions are all these things. important Catholic principles to consider when designing an AI curriculum (Rosa et al., 2021). Christology and the Social Teachings of the Church are examples of religious information that must be integrated into the educational curriculum.

Creating spaces such as virtual reality Bible/rosary reading gardens, instant messaging with prayer partner chatbots, anonymous online theological debate forums, and digital contemplation rooms with musical instruments are some strategies for designing contemplative learning environments. AI tools like personal time trackers can encourage people to take short moments to introspect and recall memories. Additionally, virtual reality platforms that replicate pilgrimages to holy locations such as Jerusalem or the Vatican can enhance spiritual encounters (Kuntz, 2022). Rather than replacing belief, the basic principle of utilizing AI technology should be to enhance and expand individuals' and society's true appreciation of belief (McKelvey, 2021).

Conclusion

The development of AI technology is so massive there are many benefits and advantages in its application in education. In particular, Catholic education faces challenges in integrating the principles of the Catholic faith with the application of AI technology so that it is relevant in facing the rapid advances in AI technology. This paper describes an AI-adaptive model of Catholic education based on a holistic analysis of Catholic pedagogy.

Developing transparent, comprehensive and fair AI ethics will encourage scientists and theologians to collaborate and work together and redesign Catholic education strategies, programs and learning environments to make them humane by better using contemplative principles.

AI ethics in Catholic education is prepared to uphold justice, inclusiveness and anti-discrimination and ensure the absence of impartiality. This requires thorough verification of data and information as well as effective training and monitoring. Although AI technology can help develop morality and religion, it requires oversight from educators to align with evangelical values.

Incorporating Catholic ideals, such as recognizing human diversity, encouraging empathy and adaptability, and enabling two-way communication, is critical to developing an AI curriculum. It is recommended that schools, churches, and AI developers ally to help create the product; this would require the creation of an ethics council that includes theologians, educators, and AI specialists.

The next investigation concentrates on empirical investigations to implement and assess the influence of Catholic-AI-based education on spiritual development and religious understanding.

References

Brown, J. S. (2022). Artificial intelligence in education: Current progress and prospects. Journal of Educational Technology, 18(2), 55-68. https://doi.org/10.1007/s10639-021-10521-5

Smith, A. (2021). Challenges of AI implementation in schools. Proceedings of the National Conference on Artificial Intelligence in Education (pp. 44-51). Springer. https://doi.org/10.1007/978-3-030-59066-8_8

Fjeld, J., Achten, N., Hilligoss, H., Nagy, A., & Srikumar, M. (2020). Principled artificial intelligence: Mapping consensus in ethical and rights-based

approaches to principles for AI. Berkman Klein Center for Internet & Society. https://cyber.harvard.edu/publication/2020/principled-ai

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. Minds and Machines, 28(4), 689-707. https://doi.org/10.1007/s11023-018-9482-5

Gravissimum Educationis. (1965). Declaration on Christian education. http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_decl_19651028_gravissimum-educationis_en.html

Henke, N., Levine, J., & McInerney, M. (2021). How artificial intelligence will impact K-12 teachers. McKinsey & Company. https://www.mckinsey.com/industries/public-and-social-sector/our-insights/how-artificial-intelligence-will-impact-k-12-teachers

Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. Nature Machine Intelligence, 1(9), 389-399. https://doi.org/10.1038/s42256-019-0088-2

John Paul II. (1987). Sollicitudo rei socialis. http://www.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_30121987_sollicitudo-rei-socialis.html

Konsili Vatikan II. (1965). Gaudium et spes. http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_cons_19651207_Gaudium- et-spes_en.html

Kuntz, J. R. (2022). The Virtual Pilgrimage: A Catholic Approximation. Religions, 13(3), 217. https://doi.org/10.3390/rel13030217

McKelvey, B. (2021). AI chatbots: Dangerous companions or virtual nurturers? The Heythrop Journal, 62(2), 209-224. https://doi.org/10.1111/heyj.13152

Moran, G. (2011). St. Augustine's philosophy of education. Catholic Education: A Journal of Inquiry and Practice, 14(4), 379-404. https://files.eric.ed.gov/fulltext/EJ934005.pdf

Paulus VI. (1975). Evangelii nuntiandi. http://www.vatican.va/content/paul-vi/en/apost_exhortations/documents/hf_p-vi_exh_19751208_evangelii-nuntiandi.html

Pham, M. C.,incorporated, D. G., Graham, J., Jordan, K., Fegg, M. J., Langenberg, R., Aapro, M., & Molzon, R. (2021). Relevance of machine learning and chatbots in oncology: The future is now. ESMO open, 6(6), 100288. https://doi.org/10.1016/j.esmoop.2021.100288

Pope Francis. (2015). Laudato si. http://www.vatican.va/content /francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Pope Francis. (2021). Message of His Holiness Pope Francis for the 107th World Day of Migrants and Refugees 2021. https://www.vatican.va/content/francesco/en/messages/migration/documents/papa-francesco_20210503_world-migrants-day-2021.html

Rai, A., Constant, N., Sabetzadeh, M., Falco, R., & Morgenstern, L. (2022). Towards Relational AI: Re-imagining human-AI interaction design. ACM Transactions on Computer-Human Interaction (TOCHI), 29(1), 1-34. https://doi.org/10.1145/3486611

Rummery, G. (1975). Catechesis, religious education and the model of the Trinity. Religious Education, 70(5), 500-514. https://doi.org/ 10.1080/0034408750700505

Seery, N., & Donnelly, R. (2022). The use of technology to enhance character development in higher education: An analysis of the impact of mobile applications on virtue. Studies in Higher Education, 47(8), 1748-1763. https://doi.org/10.1080/03075079.2020.1841120

Sgreccia, E. (2021). Theological considerations on artificial intelligence. Theological Studies, 82(1), 71-92. https://doi.org/10.1177/0040563920941666

Snelson, C. (2021). Artificial intelligence in education: Current insights and future directions. TechTrends, 65(2), 147-148. https://doi.org/10.100 7/s11528-021-00590-5

Stringer, R. (2021). Educating artificial intelligence: operationalizing Catholic values in technologies for education. International Studies in Catholic Education, 13(1), 57-76. https://doi.org/10.1080/19422539.2021.1875791

Tamarit, C. I., Pijoan, E. T., & Vicent, N. (2021). AI and Education in the Framework of Catholic Social Teaching: Anthropological and Ethical Approach to AI. Religions, 12(3), 198. https://doi.org/ 10.3390/rel12030198

The Holy See. (1997). Catechism of the Catholic Church. Libreria Editrice Vaticana. http://www.vatican.va/archive/ENG0015/_INDEX.HTM

UNESCO. (2021). Ethics of artificial intelligence: Towards a human-centered approach. UNESCO Digital Library. https://unesdoc.unesco.org/ark:/48223/pf0000379721

United States Conference of Catholic Bishops. (2020). The Catholic school on the threshold of the third millennium. http://www.vatican.va/roman_curia/congregations/ccatheduc/documents/rc_con_ccatheduc_doc_27041998_school2000_en.html

Wagland, V., Hobbs, K., Moro, C., Shalowitz, D., Fung, F. Y., & Russell, L. (2021). Implementing faith-adapted digital health interventions: Systematic review. Journal of Medical Internet Research, 23(2), e22817. https://doi.org/10.2196/22817

Williams, A. (2021). Mystical experience apps—AI, neuroscience, and religious experience. Zygon, 56(3), 696-726. https://doi.org/10.1111/zygo.12692

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). A systematic review of research on artificial intelligence applications in higher education–where are the educators? International Journal of Educational Technology in Higher Education, 16(1), 1-27. https://doi.org/10.1186/s41239-019-0171-0

AUTHOR PROFILE



Angelo Luciani Moa Dosi Woda, S.S., Lic.Th., born in Jakarta, Indonesia, 30 September 1978, email: serafim.cse@gmail.com. Education: Graduated from Licentiate in Sacred Theology at Pontifical University of Saint Thomas Aquinas (Angelicum) Rome, Italy in 2018. My current functional position is as a lecturer of dogmatic theology at STIKAS Santo Yohanes Salib, Bandol.