Promulgating Knowledge on Innovative Technology and SDGs Through Human-Technology Interaction in *Ready Player One* and *The Circle*

Shenbagam Jaisankar, SASTRA Deemed University, India
Venkatraman G, SASTRA Deemed University, India

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Abstract
The study aims to create a cognizant of futuristic technology using science fiction novels. The inquiry explores how the cognitive development and behaviour skills of humans are reformed using technology. For a quantitative study using the simple random sampling method, a survey was conducted around 250 participants belonging to various streams to test their knowledge on the four futuristic technologies - SeeChange, Childtrack, Neibourwatch, and OASIS introduced in two novels *Ready Player One* and *The Circle*. The analysed data and its consequent results obtained from the inspection stated that many were not aware among the budding generation. Further, to enhance their knowledge and to implement the idea that technology should not be considered as a replacement for human capabilities but to be regarded as the tools to augment our life, the research also provides how the HTI can be developed through the SDGs 9 and 16. It emphasizes the importance of promoting inventive sustainable technologies, thwarting crimes, injustice and abuse towards building an innovative lifestyle and democratic society. This examination intends to reflect the significance of these technologies and acquaintance to academics and parents about safety and security. It focuses on putting forth our ability in creating a better world, aiming to be an eyeopener for the scientists, and policy makers who help in forming new paths for technology in relation to human life. The additional outcomes highlight that educationists and experts are engrossed in specialized training and the need for curriculum design with practical sessions to attain global issues.

Keywords: cognitive development, futuristic technology, human-technology interaction, science fiction, Sustainability Development Goals

Introduction

Human-Technology Interaction (HTI) delves into how individuals interact with and utilize technology across various aspects of their lives. Human Cognition forms the foundation of our thoughts and behaviors, serving as the underlying mechanism that shapes how we interact with the world. It enables us to navigate complexities, solve problems, and adapt to new situations, reflecting its fundamental role in human intelligence and functioning.

We have focused on SDG 9 and SDG 16 for the present study. According to SDG 9 (Industry, Innovation, and Infrastructure), promoting sustainable industrialization and affordably fostering innovation contribute to developing resilient infrastructure. Implementing SeeChange, OASIS & NeighborWatch technologies in a company or industry enhances innovation, ensures worker safety, and helps to fortify the environment.

SDG 16 (Peace, Justice, and Strong Institution) aims to protect children from abuse, trafficking, and exploitation and reduce all forms of violence. By introducing ChildTrack, NeighborWatch, and SeeChange technologies into society, we can work towards achieving target indicators such as 16.1, 16.2, and 16.5. These technologies will provide children and people safety, security, and justice. These technologies are introduced in the two science fiction novels.

Science Fiction bids optimistic possible futures; it is used for discussions of ethical dilemmas, and it will create the possibility to model ethical ideals. Also, Science Fiction served as an inspiration for science and technology innovation. The novels selected for my study, such as *Ready Player One* and *The Circle*, project the trajectory of current technologies, raising crucial questions about the boundaries in our lives.

The Circle by Dave Eggers is a dystopian novel centered around technology in society. *The Circle*, set shortly, focuses on Mae, a new employee at *The Circle*, the most robust internet company in the world. Surveillance cameras are employed to ensure safety, ostensibly reducing crime rates. The technologies studied in the novel are NeighborWatch, SeeChange, and ChildTrack.

The novel *Ready Player One* is set in a dystopian future where people spend most of their time in a virtual reality world called OASIS. Users can log in and interact with a digital environment. The digital platform provides the user with a scope for work, playing games, socializing, and exploring virtual worlds and environments. OASIS (Metaverse) technology was used in this novel for the study.

Technologies Used in *Ready Player One* & *The Circle*

i) SeeChange Camera

In the novel, *The Circle* many technologies were introduced; SeeChange is one of the main technologies portrayed by the author. It is described as a small camera that wirelessly streams live high-definition video. SeeChange is highly valuable because privacy is not a priority in these contexts. In some places, we need safety and security for ourselves and our belongings. We should know how to use and understand the societal implications of using SeeChange technology.

ii) ChildTrack

It is a small chip that can be implanted into the bone of a child's body, allowing parents to know their child's location at all times. With the help of ChildTrack technology, the kid can be tracked down immediately, and also reduce child abduction, rape, and murder. This technology doesn't do anything but tell us where a child is, it's just a simple tracker. It is embedded into the bone, it stays there, and can't be seen with the naked eye.

iii) NeighborWatch

It is a neighborhood watch service, utilizing SeeChange cameras which are placed throughout the neighborhood so that residents can identify suspicious persons. People in the neighborhood register their data and biometrics with NeighborWatch to identify them as residents. Residents of the neighborhood or known visitors are displayed as blue figures. Unknown people are displayed as red figures, triggering a notification to residents. To promote peace, safety, and security within the community, NeighborWatch has been introduced.

iv) Metaverse (OASIS)

OASIS is a source of information and the way people can connect with one another. It is an open-source reality and we could design a completely new identity for ourselves, fully customizing our appearance and voice as perceived by others. "In the OASIS, you could create your own private planet, build a virtual mansion on it, furnish and decorate it however you like and invite a few thousand friends over for a party" (Cline, 2011, p. 57).

Most of the OASIS public school teachers seemed to genuinely enjoy their job, probably because they didn't have to spend half their time acting as babysitters and disciplinarians. The OASIS had the potential to revolutionize how people worldwide lived, worked, and connected. "The OASIS would ultimately change the way people around the world lived, worked and communicated" (Cline, 2011, p. 56). It also transmits entertainment, global politics, and even social networking.

Objectives of the Study

- To identify whether the select technologies affect students' cognitive development and human skills.
- To assess students' understanding of the technologies used in science fiction novels.
- To suggest ideas for further education and to provide safety measures for implementing the technology.
- To promote these technologies to achieve sustainable development goals (9 & 16) and to integrate these technologies into the educational curriculum.

Hypothesis of the Study

The selected four futuristic technologies enhance the cognitive development and skill of tertiary level students.

Status of the Literature

The selected literature encompasses a wide range of studies and perspectives that explore the intersection of technology, cognition, and science fiction. Zhao et al. (2022) and Ren (2023) examine how evolving technologies such as virtual reality and artificial intelligence, impact cognitive development and social interactions among people. Leung et al. (2022) and Huang et al. (2022) highlight the prospective of technology to develop cognition in adults and enhance cultural acceptance among students. Cline (2011) and Eggars (2013) both explain how advanced technologies have been useful for society and have reshaped our culture and perceptions.

Aku (2024) delves into the implications of cognitive psychology on human behavior and decision-making. Bleecker (2009) and Shedroff and Noessel (2012) talk about design fiction as a method to envision and critically examine technology's future is explored through scholarly essays and reviews. This literature review, reveals that my perspective has not been researched anywhere.

Perception Survey Among Engineering Students on These Technologies

Methodology

Survey details: We surveyed the engineering students of various branches of SASTRA Deemed University, Thanjavur, India, to ascertain their perception of cognitive development and skill of humans in the selected technologies through science fiction novels. The survey questionnaire was distributed as a Google form. However, the first author explained and assessed the knowledge about the concept of human cognition, optimistic and pessimistic views of every technology, and the objectives of the survey to the students in the classes before their responses.

Tool description: The survey questionnaire comprised 25 open-ended questions with a 5-point Likert scale. The questions were classified into four different domains namely perception, attention, learning and problem solving.

Method of collection: 250 responses were collected using the simple random sampling method and the results were analyzed using the ANOVA statistical tool.

Analysis & Results

The survey's target audience consists of B.Tech students of CSE, ECE, EEE, Aerospace, Biotechnology, Mechanical Engineering, AI & Robotics branches were selected using a simple random sampling method. It was observed that students were initially unaware of the technologies such as SeeChange, ChildTrack, NeighborWatch & OASIS (Metaverse). The data encompassed the performance of 250 participants' responses to the 25 questions.

The pie chart represents responses to the question: "Are you aware of these technologies?" Most respondents, 80%, lack awareness of the technologies, while only a small portion, 20%, are familiar with them. Many students are unaware of these technologies because, nowadays, many do not read science fiction novels. Instead, they are deeply engaged with mobile phones and internet connectivity. It's all the more baffling because the technology is getting cheaper daily. To gain knowledge of new technologies, one should read science fiction novels

because it has been found that fictional technologies can inspire real-world applications and prototypes. Science fiction could be introduced in the curriculum to enhance learners' creativity.

We explained that these technologies are beneficial in promoting SDGs 9 & 16, contributing to achieving these goals. By leveraging these technologies, we can advance sustainable development, particularly in building resilient infrastructure, fostering innovation, and ensuring proper education, safety, and security. They also play a crucial role in reducing violence and abuse. With the support of these technologies, we can promote peaceful and inclusive societies, provide access to justice for all, and uphold principles of equity and fairness.

While these technologies may initially present challenges or negative impacts, it is essential to recognize that technology inherently has both optimistic and pessimistic aspects. So, we should always grow and create new things; that is how humankind works. By responsibly focusing on the positive potential and adapting to these technologies/innovations, we can harness their benefits for the greater good. Though there will be limitations to the implementation, we can try our part and make a change.

Finally, we found that there is not much difference between mean and standard deviation. So, we have gone for the ANOVA to see if there is any significant difference.

Table 1: Perception on Technologies of Engineering Students

ANOVA

Technologies	N	Mean	Std. Deviation	Variance
SeeChange	250	13.7800	2.10841	4.445
ChildTrack	250	14.8640	2.41429	5.829
NeighborWatch	250	13.9360	2.40229	5.771
OASIS	250	14.4520	2.14525	4.602

Table1shows the 250 observations ranging from a minimum of 6.00 to a maximum of 20.00, with an average (mean) of 14.8640 and a standard deviation (SD) of 2.41429. The SD gives an idea of how much the individual values in the dataset deviation from the mean.

Table 2: Age – (SeeChange, ChildTrack, NeighborWatch, OASIS)

ANOVA

Technologies		F	Significance
SeeChange	Between Groups	2.443	.119
ChildTrack	Between Groups	.835	.362
NeighborWatch	Between Groups	1.035	.310
OASIS	Between Groups	.585	.445

Note: Significance level is 0.05

As shown in table 2, the p values for SeeChange, ChildTrack, NeighborWatch, Metaverse are 0.119, 0.362, 0.310 & 0.445 respectively. The awareness levels do not differ significantly between age groups, because the p -value is greater than 0.05 in the age category.

Table 3: Gender - (SeeChange, ChildTrack, NeighborWatch, OASIS)

ANOVA

Technologies		F	Significance
SeeChange	Between Groups	1.151	.329
ChildTrack	Between Groups	.387	.763
NeighborWatch	Between Groups	.634	.594
OASIS	Between Groups	.996	.395

Note: Significance level is 0.05

The table 3, exemplifies the results of a one-way ANOVA analysis to test whether there is a statistically significant difference in awareness of four technologies between male and female. For all four technologies, the p-values are exceeding 0.05, indicating no statistically significant difference in awareness between male and female participants for any of these technologies.

Table 4: Residential - (SeeChange, ChildTrack, NeighborWatch, OASIS)

ANOVA

Technologies		F	Significance
SeeChange	Between Groups	.004	.952
ChildTrack	Between Groups	1.326	.251
NeighborWatch	Between Groups	.130	.719
OASIS	Between Groups	1.668	.198

Note: Significance level is 0.05

The results in Table 4, illustrates residence of the four technologies whether there is significant difference in the p-values for SeeChange, ChildTrack, and NeighborWatch. It suggests that there is no significant difference in awareness levels across residential groups (rural, urban, semi-rural, semi-urban), as they are greater than 0.05. The result indicates that all the respondents know about the technology and its precedence.

Table 5: Family Background - (SeeChange, ChildTrack, NeighborWatch, OASIS)

ANOVA

Technologies		F	Significance
SeeChange	Between Groups	.004	.952
ChildTrack	Between Groups	1.326	.251
NeighborWatch	Between Groups	.130	.719
OASIS	Between Groups	1.668	.198

Note: Significance level is 0.05

Table 5 displays the result of the ANOVA test analysing the awareness of four technologies on Family Background. The awareness levels do not significantly differ between individuals from educated and uneducated family backgrounds. This indicates that family background does not have a substantial impact on the awareness of these technologies based on the data provided because p-value is greater than 0.05.

From the human cognition aspect of perception, according to respondents' opinions on SeeChange, it is safe to have SeeChange cameras/ SeeChange technology installed in their houses/ private areas, given safety and security despite SeeChange invading a person's privacy. From the aspect of attention, installing a SeeChange camera at home brings attention or focuses on the difficulties/ struggles undergone within the wall.

In ChildTrack technology, perception can enhance child safety and security. According to the aspect of attention, constant use of ChildTrack might affect a child's ability, decision-making, and problem-solving skills. From the human cognition aspect of learning, respondents' opinions on NeighborWatch suggest that the installation of NeighborWatch helps people learn more about the safety and security of themselves and their surroundings.

From the human cognition aspect of learning, respondents' opinions on OASIS suggest that the life skills learned from virtual reality can be helpful for implementation in real life. An individual's learned decision-making and problem-solving abilities from a virtual reality help in the real world, particularly in high-stakes or complex scenarios. All these technologies may take over the function, owing to the developments in AI, Nanotechnology, Genetic Engineering, Network Security, and so on.

The researcher provided the respondents with knowledge about these technologies. Once the knowledge has been assessed, all respondents determine a theoretical understanding of these technologies and their advantages, and the results indicate that the students possess in-depth knowledge. As we all know, without an in-depth understanding, one should not attempt to answer questions about the aspects of human cognition related to these technologies or their impact on privacy or cognitive development. Finally, the knowledge of the respondents was assessed.

This understanding was then assessed through a multiple-choice questionnaire that was served to students as Google Forms. This knowledge will be beneficial and adequately prepared to utilize such technologies. Therefore, it is proposed that these technologies be integrated into the curriculum in education and that policies be developed to support their implementation.

Subsequently, we aim to determine whether these technologies affect humans' cognitive development/abilities and skills. To test this perspective, we created a Google form based on four key aspects of human cognition: perception, attention, learning, and problem-solving of the selected technologies for the study. Then, the questionnaire was served to students.

Results From the Survey Questionnaire

Here, we wanted to know whether these technologies enhance or affect human cognitive abilities, cognitive development and skill on humans and creative thinking and exploration.

Figure 1: Technology Affects the Cognitive Development

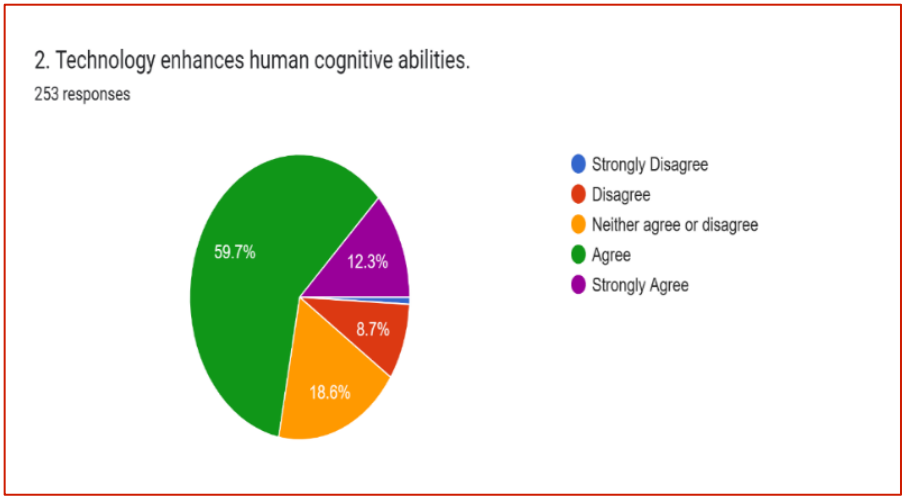
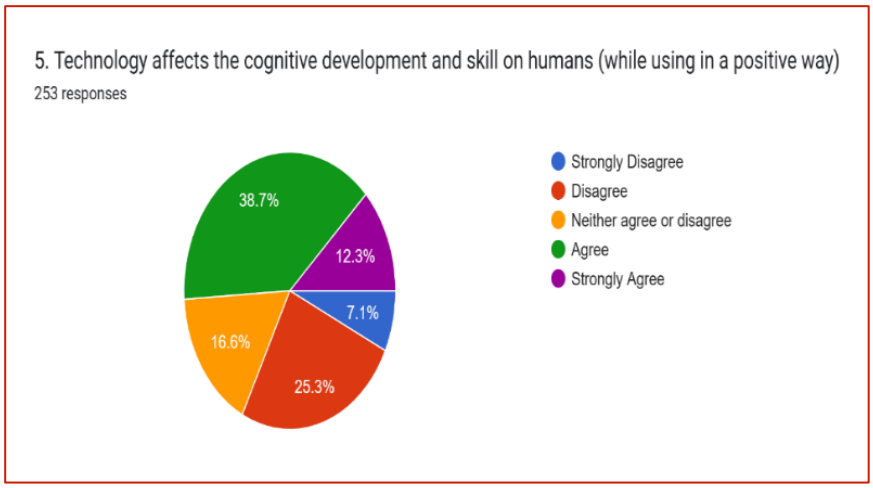


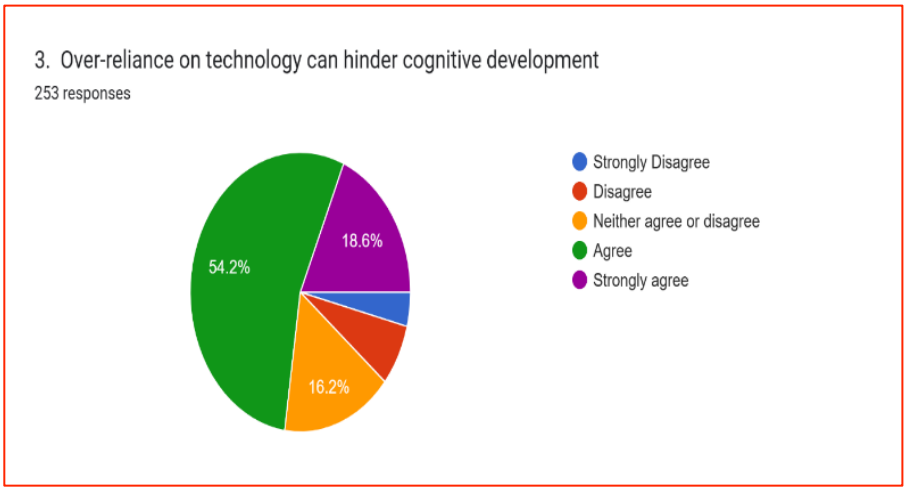
Figure 2: Technology Enhances Human Cognitive Abilities



As shown in Figure 1; the analysis of the data indicates that, around 59.7% of respondents thought that technology will develop cognitive abilities and creative thinking and it could enhance human cognitive development of the people. Figure 2 denotes that around 38.7% of students believe that technology affects cognitive development and human skills. These findings suggest a nuanced view where a majority see technology positively contributing to cognitive enhancement, while a notable minority acknowledges its influence on human capabilities.

But according to respondents, when a person has excessive dependence or over-reliance on technology, it will hinder cognitive development. The chart below delineates its key concerns:

Figure 3: Dependence on Technology Can Hinder Cognitive Development



We aim to promote these futuristic technologies to society to achieve SDGs 9 & 16. Survey results show that around 41.1% agreed that these technologies will help foster innovation and promoting peaceful and inclusive societies. Also, it could help to reduce abuse and enhance safety, security, and education for people. The charts below illustrate its concerns:

If we want to foster these technologies, we must first promote them by following these ideas:

- Visiting schools, social gatherings, creativity awareness campaign

- Workforce development and global collaboration
- Posting these ideas on social media by making it look attractive for people to sit and read or watch as a video, can reach a lot of people
- By giving awareness to the rural people
- Establishing technology-friendly policies and regulations
- Fund research and development programs
- Develop online resources and tutorials

The technological development would be very beneficial and will take a positive lead unless it affects or invades the privacy of a person.

Conclusion

The study focused on how humans understand the technologies depicted in the novels *Ready Player One* and *The Circle* and their implications for societal safety and security. Four specific technologies from these novels were selected for examination. A survey was conducted to assess awareness of these technologies and determine whether their use enhances human cognitive development and skills. The results revealed that respondents were unaware of these technologies and their societal effects. Hence, the researcher provided essential knowledge about these technologies before assessing students' perceptions.

The research findings indicate that awareness of these four technologies enhances tertiary-level students' cognitive abilities and skills. But, if people have excessive dependence or over-reliance on technology, it will hinder their mental development and abilities. These technologies will help foster innovation and promote peaceful and inclusive societies. It could also help reduce abuse and crime cases, improve safety and security, and provide educational value to the people.

To achieve Sustainable Development Goals 9 and 16, the technologies selected for this study can significantly eradicate crimes and enhance societal justice. Additionally, safety measures can be proposed to implement advanced technology inspired by science fiction novels to address privacy concerns. Integrating these technologies into society with an optimistic perspective can also be incorporated into educational curricula to promote awareness and understanding of the technology. The study results show that when students interact with these technologies, cognitive development and behavior skills modification are possible. These technologies will be an eye-opener for scientists, technocrats, and policymakers.

Scope & Limitations of the Study

The study's limitation is that it focused exclusively on engineering students. To broaden the scope, surveys could be extended to include students from humanities, arts, sciences, and education fields, as well as gathering data from teachers and parents.

To expand the scope of the study, one can survey other science fiction novels of recent origin and identify other technologies portrayed in the novels. From this, a new study can be conducted to find out the evolution of the emerging technologies.

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Contact email: shenbajai2000@gmail.com