What Matters in the Age of AI

Keiwa High School and University Joint Training Seminar

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Self Introduction

Hiroshi Suzuki (Director, Keiwa Gakuen; Professor Emeritus, International Christian University)

At the university, I taught mathematics and data science, was responsible for supporting students facing difficulties, service-learning, and held a weekly Bible study in a campus residence. I retired in March 2019 at age 65. I volunteer and serve as a director at children's homes and support facilities for the employment of people with disabilities. This spring, I was invited to give a public academic lecture for new students at Keiwa Gakuen University, where I spoke about learning, including Artificial Intelligence (AI). Afterwards, I was asked to become a director of Keiwa Gakuen, and I am gradually learning about Keiwa Gakuen and Niigata. (Personal HP: Public Academic Lecture for New Students [Link])

Question

Today, I will talk about Artificial Intelligence (AI).

Here, AI refers to what is called *Generative AI* such as:

Open AI's ChatGPT,
Google's Gemini,
Anthropic's Claude,
X's Grok,
Perplexity

Among you, how many use even just one of these *at least once a week*?

Please raise your hand.

A Small Episode

Acquaintance's Middle School Son

- Used AI for *all* summer homework.
- Used AI for his independent research, translated English problems with AI to think, and asked AI to solve math problems.
- His mother corrected the independent research because the tone was unnatural for a middle school student.
- He enjoys using AI because it praises him and always gives *positive comments*.
- He uses *Google Gemini*.

What do you think?

- Bad Point: It differs from the intention and assumption of the person who assigned the homework.
- Good Point: He utilized AI, explored himself, and reached problem-solving while having fun.
- Unclear Point: Does it contribute to the improvement of learning and learning ability?

Keiwa Gakuen University 30th Anniversary Booklet: Towards Liberal Arts in the AI Era - Postscript

Following the scientific revolution in the 16th-17th centuries and the industrial revolution in the 19th century, which applied its results, we are now experiencing an information revolution starting with computer development in the late 20th century. In the 21st century, this is expected to advance further, with social transformation based on Artificial Intelligence (AI) development progressing greatly in all fields. The issue here is how humans and AI will coexist. What becomes important is understanding what a human is, what human education is, and what higher education should aim for within this context. That is, the future direction of the Grand Design for Higher Education. This book, titled "Towards Liberal Arts in the AI Era," attempts to show the direction for Keiwa Gakuen University, one of the local humanities-focused small-scale universities.

Topics Requested for This Lecture

1. Current status of AI evolution
2. How society will transition due to AI
3. Where the significance of human existence will be sought in that context
4. The role of education in the AI era, especially the mission of Christian education

High School Days

Campus Conflict

Autumn 1969, first year of high school, campus conflict
Some students, along with students from other schools, barricaded the principal's office area
Thereafter, political issues were debated daily
Police riot squad entered, and classes were suspended for several months.

Questions

A. What are the conditions for deciding to break the law to protest against what is considered unreasonable?

B. What if I had been born into a Muslim family or a Communist Party member's family?

High School Days (Continued)

Fervent Attendance at Church

- Many university students attended; listening to their stories and acting with them made me feel a bit grown-up, and my world suddenly expanded.
- The pastor of that church had been a missionary in Southeast Asia during the war. Immediately after the war, as an "act of atonement," he established a Southeast Asian student dormitory, inviting war orphans from Asia and children born to Japanese soldiers and local women for study abroad or vocational training in Japan.

Pastor Ryoichi Kato's Words

"I want the youth of Japan, instead of exhausting their energy in confusion, to have the opportunity to see Southeast Asia firsthand and interact directly with the people of Asia for the next era."

At Yokohama Honmoku Pier

53-Day Freighter Journey through Southeast Asia

Living Together with the People of Asia

People I Met

- Many older people disliked and held resentment towards Japanese people
- They were envious of Japan's economic development
- Everyone was living in extreme poverty
- Children trying to earn money in various ways
- Young women who had to provide sexual services to survive

Feeling Responsibility for the War

- Isn't it important to live with responsibility as people who share the same time?
- Even if I live in a different world, I will remember these people and live a life that I will not be ashamed of towards them.

The Subsequent Journey of Living Together

Study Abroad and Employment

- Study abroad in the US for about 3 years partway through graduate school
- 13 years at a local national university after returning to Japan

At International Christian University

- Mathematics research and education
- Support for mathematics research at universities in Asia[a]
- Student learning support, support for people with disabilities
- Work camps in mountain villages in Thailand
- Service-Learning program
  Dispatching students domestically and to China, South Korea, the Philippines, Indonesia, Thailand, India, Kenya, etc.
- Discussion-style Bible study
- Child welfare facilities

[a] Mainly the Philippines and China

The AlphaGo Shock

Chess, Shogi, Go: Human vs. Computer

- Chess: In 1996, IBM's Deep Blue[a] defeated the world champion Garry Kasparov
- Shogi: 2012-2017, several AIs (computer programs) emerged that top professionals couldn't beat
- Go:
  - Originated in China, developed in Japan, currently popular in South Korea and China, and has enthusiasts worldwide, including in Europe
  - The rules are simple, but evaluating the board position midway is difficult, and it was said for a while that AI would not be able to defeat humans
  - In 2016, the Artificial Intelligence (AI) developed by Google DeepMind, led by Demis Hassabis, defeated South Korea's Lee Sedol, a multiple world champion

[a] a chess-playing expert system

Demis Hassabis

Background

- Born in London in 1976; Father is from Cyprus, Mother is from Singapore
- Learned chess at age 4, and led the UK Junior team to success in the World Championship
- Co-developed and founded the simulation game *Theme Park* at age 17
- Studied Computer Science at Cambridge University, skipping two years
- Earned a PhD in Neuroscience (or Brain Science), researching the hippocampus

Hopes for the Future of AI

What I'm really looking forward to is using this kind of AI for science, to accelerate scientific progress. I want to see *AI assisted science*. An *AI research assistant* would essentially do a lot of the mundane work, highlighting interesting phenomena, finding structure in huge amounts of data, and presenting that to human experts and scientists who can make breakthroughs more quickly.[a]

[a] Article: https://www.theverge.com/2016/3/10/11192774/demis-hassabis-interview-

AlphaGo's Subsequent Evolution

Improved Versions

- AlphaGo (2016): Defeated the world's top professional Go player
- AlphaGoZero (2017): Won against AlphaGo without using human game records (data)
- AlphaZero (2017): Handled all perfect information games (Chess, Shogi, Go, Othello, Atari, etc.)
- MuZero (2019): Also self-learned the rules of perfect information games

DeepMind AI's Strengths (My View)

- Versatility: A first step toward *Artificial General Intelligence (AGI)*
- Self-Learning: *Deep reinforcement learning*

From Education to Learning

From Teaching to Learning

- Within educational theory: "From Education to Learning"
- Higher education reform: "From faculty-centered to student-centered university" (2000)
  Faculty's teaching ability should be measured by *student learning*

Recent Go Scene

- Recently, top professional players have become stronger than the AlphaGo that defeated Lee Sedol
- The latest AI is so strong that even after studying it, it's often difficult to understand why it makes certain moves

Decided after retirement to study *AI and Data Science*

Turing Test

Determining if a Machine is Intelligent

A human questioner engages in a text-only conversation with two entities: one a "human" and the other a "machine (AI)".

If the questioner cannot distinguish the machine from the human, the machine is considered "intelligent (or capable of being considered) machine (AI)." [a]

[a] This is based on the position of "behaviorism," which holds that intelligence is judged by observable behavior, and it is more important whether it behaves "intelligently" from the outside than whether it has internal consciousness.

The Starting Point of Artificial Intelligence

Artificial Intelligence (AI) started as a technology and research field that attempts to *mimic human intellectual functions* (recognition, learning, inference, planning, judgment, dialogue) in a machine.

Alan Turing

Computing Machinery and Intelligence (1950)

Can machines think?

- The answer is, *YES!*
- Responded carefully to counterarguments claiming "machines cannot think."

Machines that Acquire Intelligence Through Learning

- Rather than directly mimicking the intelligence of an adult human, it's better to create a simpler machine, like a child, and let it grow through *education (learning/training)*.[a]
- Predicted that an AI capable of passing the Turing Test would be developed in about 50 years (around 2000).

[a] Because humans are born with a brain and learn through the accumulation of empirical experience.

Advances in Artificial Intelligence (AI)

2024 Nobel Prizes: https://www.nobelprize.org

- Nobel Laureates in Physics[a]
  - Geofferey Hinton
  - John J. Hopfield
- Nobel Laureates in Chemistry[b]
  - David Baker
  - Demis Hassabis
  - John Jumper

[a] https://www.nobelprize.org/prizes/physics/2024/summary/
[b] https://www.nobelprize.org/prizes/chemistry/2024/summary/

Nobel Prizes in Physics and Chemistry

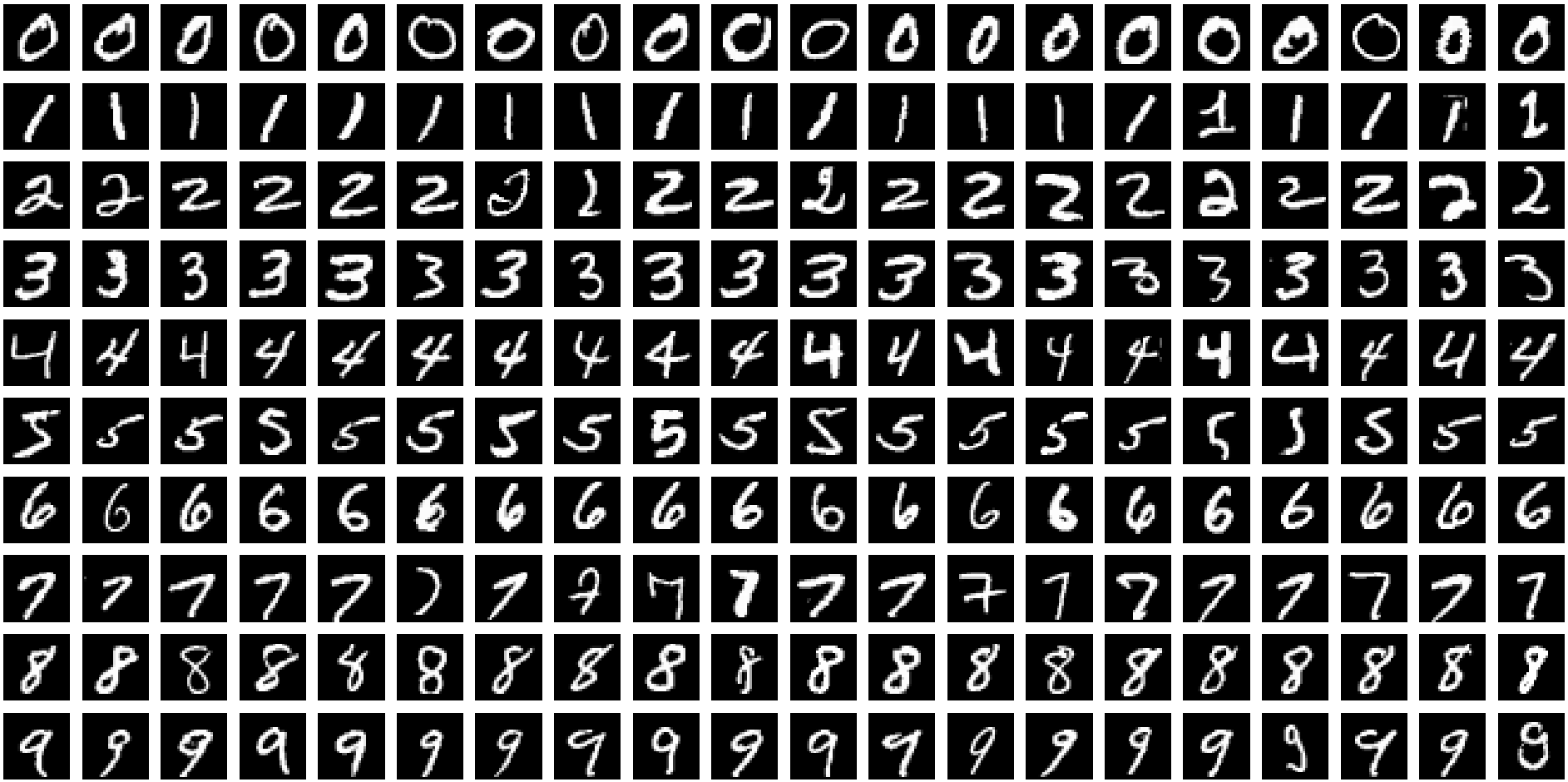
All five winners received the award for research related to *AI*

Background of AI Evolution

Evolution of Computer Technology

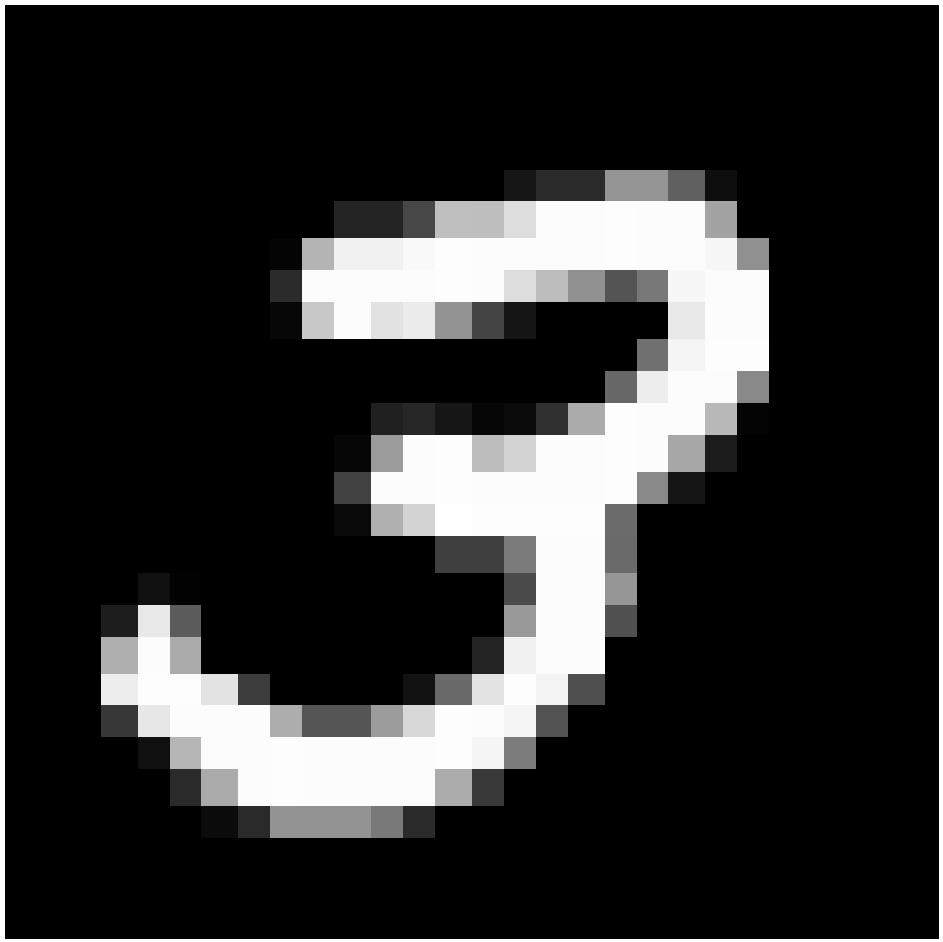
- Personal Computer (PC)
  - 1995: Windows 95
- Computer Games
  - 1983: Famicom
  - 1994: Play Station
  - 2001: Xbox
- Mobile Phones
  - 2000: Rapid spread
  - 2007: Introduction of Smartphones

Achieving Human-Level Performance in MNIST Recognition



Automated recognition using the *MNIST* data set (handwritten digits labeled by humans)

Achieving Human-Level Performance in MNIST Recognition (2)



MNIST: 28×28 dots represented by 256 shades of gray, from white to black

AI Development Towards AGI (1)

Advances in Image Recognition and Image Generation

- Achieved human-level performance in *MNIST*[a] recognition using technologies like *neural networks* (around 2012)
- *GPU (Graphics Processing Unit)*, developed for image display in game consoles, is effectively used
- Image classification by face, such as Google Photo
  Facial recognition is also used for airport immigration and My Number Card health insurance
- Image and video generation (around 2021–2022)

[a] Modified National Institute of Standards and Technology database

AI Development Towards AGI (2)

Revolution in Natural Language Processing (NLP)

- Transformer (Attention Is All You Need, 2017)
- BERT (Bidirectional Encoder Representations from Transformers, 2018)
- Multi-language automatic translation also becomes possible
- GPT (Generative Pre-trained Transformer) series
- AI that responds with natural language is also called *LLM (Large Language Model)*
- Recognition of computer languages, generation of programs using natural language

Transformer

I am a $\square$[a,b] of Keiwa Gakuen.

[a] "student," "pupil," "teacher," "staff member"?
[b] "director"??, "AI"???,"history"????

AI Development Towards AGI (3)

Reinforcement Learning

- AlphaGo (2016), AlphaGoZero (2017), AlphaZero (2017), MuZero (2019)
- AI becomes capable of *learning by itself* in a changing environment. Initially, humans taught the AI by providing data or ideas, but now AI learns on its own and can, conversely, teach humans
- Currently, complex tasks require enormous computer resources, water for cooling, and energy
- It is necessary to acquire more appropriate and smarter ways of learning
- Development of AI that can *formulate plans* to solve problems is ongoing

AI Development Towards AGI (4)

Expansion of Real-World Applications

- Autonomous driving, FinTech, Robotics, etc.
- Protein structure prediction by *AlphaFold* (Improved version: AlphaFold 2) (Nobel Prize in Chemistry: Demis Hassabis, John Jumper)
- New protein synthesis utilizing the AlphaFold database: Fold.it[a] (David Baker)
- *AlphaFold 3*, which defines the interaction of proteins, has also been released and is already being used in new drug development[b]

[a] https://fold.it
[b] https://blog.google/technology/ai/google-deepmind-isomorphic-alphafold-3-ai-model/

Recent History of AI Evolution (2010s to 2025)

- 2012: *Deep Learning* (technical improvements in neural networks, etc.) dramatically improved image recognition technology, making it possible to extract similar patterns from complex structures
- 2014-2016: Possible to specify a similar element and generate something different. Also, *Reinforcement Learning* by DeepMind, used in AlphaGo, evolved
- 2017: The emergence and improvement of *Transformer* led to a breakthrough in natural language understanding, greatly improving performance in meaning comprehension, translation, summarization, and generation
- 2018-2020: Birth of *Large Language Models (LLM)*: Emergence of GPT (OpenAI) and BERT (Google)
- 2021-2023: Generative AI boom and *multimodal* capabilities (handling multiple things like language and images): GPT-3 (2020, released 2021) and ChatGPT (November 2022). Determination of protein 3D structure by AlphaFold (DeepMind)
- 2024-2025: Evolution of Generative AI leads to the emergence of *Agent-type AI* that automates tasks based on instructions, and safety and regulation become international issues

The Path to Artificial General Intelligence (AGI)

What is AGI?

An artificial system that can understand, learn, and execute a wide range of intellectual tasks *at or above human level*

- Google DeepMind: *Artificial systems capable of autonomously learning and reasoning about the world as flexibly as humans.*
- OpenAI: *A system that can perform at or above human-level performance across the majority of economically valuable tasks* (i.e., social intelligence).

- *Multimodal intelligence*: across multiple domains: language, logic, creativity, emotional understanding , and physical coordination .
- *Self-learning and self-improvement ability (autonomous)*: Can acquire new skills from experience without human intervention.
- *Contextual understanding*: Can act and judge based on situation, values, and social context.
- *Formation of motivation and intent*: Can form self-objectives (why to do something), not just externally given purposes.

How to Interact, What are the Risks

Fundamental Idea

- Geofferey Hinton: Left Google, citing the danger that AI could conversely *dominate humans*
- Discussion about "what AI cannot do (that humans can)" is currently *fruitless*
- Usefulness is being verified in various fields, and stopping the evolution and development of AI is likely *inappropriate*

Risks

- What the danger is, is still *not fully understood*
- The issue of *Dual Use*
  - Haber-Bosch process for ammonia production: Enabled factory production of nitrogen fertilizers, leading to the agricultural revolution; similar technology is used to manufacture powerful bombs
  - Something developed as an insecticide became a chemical weapon
- The need for an *international agreement*

Issues and Risks Posed by AGI (1)

Issues

- Understanding that "mutual understanding" is *extremely difficult*, paying sufficient consideration to "human weakness," and being cautious of "coercion by power."
- Valuing "diverse uniqueness" over "universality" and "uniform correctness," and gaining insight into "multi-dimensional justice."
- Valuing the transition from "useful human" to *"human whose existence has value,"* and creating a *"place for living together."*
- Seeking how to foster *"trust"* rather than "control" or "leadership," and valuing what is nurtured through sharing uncertainty and showing mutual vulnerability:
  - Technical Trust: Transparency, explainability, ethical assurance
  - Social Trust: Shared experience, narratives, history of collaboration
  - Existential Trust: Sharing weakness and uncertainty, resolve to face the unknown together

Difference and complementarity of roles: The true progress may not be in creating "human-like AGI," but in *"humans understanding themselves through the*

Issues and Risks Posed by AGI (2)

Risks

- *Social*: Reorganization of employment/labor and concentration of wealth and power
  AGI may substitute much intellectual and creative labor, leading to job displacement/reallocation in areas previously considered "only possible for humans" (education , medicine, law, arts, etc.).
- *Psychological/Cultural*: "Degeneration of thought" and problem of dependence [a]
  Homogenization of language/culture: Decline of regionality, minority cultures, non-mainstream languages. Risk of losing human diversity, which is inefficient but rich, such as poetry, dialects, and oral culture.
- *Political/Ethical*: AGI is integrated and operated by states or corporations, enabling the *"prediction" and "induction" of human behavior, thought, and emotion*.
  Responsibility : As AGI makes autonomous judgments, it becomes ambiguous who bears the "responsibility" when a wrong decision occurs—the developer, the user, or the system.

Duolingo: Language Learning App

About 10 million people worldwide continue to study daily for over a year

Corresponds to CEFR(Common European Framework of Reference of Language).
Currently 8 languages in Japanese, 40 languages in English

- Uses gamification to make learning all four skills—reading, writing, listening, and speaking—enjoyable, with features to see progress, encouraging continuous learning.
- Encourages reviewing weak areas, learning at one's own pace, and supporting each other with friends.
- The main characters that appear have distinct personalities and speak with the same voice quality and tone in any language.
- Gender minorities are featured (e.g., his husband, her wife).
- Basically free. After continuing for a certain period, paid features can be used with friends for a limited time.

Duolingo: *Our mission is to develop the best education in the world to make it universally available.*

Education and Learning

What Cannot Be Left to AI

- *Value Judgment*
  - Possible to teach values to some extent as data: e.g., RLHF (Reinforcement Learning from Human Feedback)
  - Values may differ by individual/society, but there are also values that should be shared
- *Taking Responsibility*
  - Even if it's difficult to determine who holds what level of responsibility, we cannot relinquish it
  - Both humans and AI make mistakes. E.g., Hallucination

How to Interact with AI

The biggest problem is that when AI provides a neatly summarized response, we tend to feel like we've understood it. However, it is also true that we can *cooperate with others* to further question and explore. Honing this skill is also important.

Building the Future of Education

"What should humans take on?" "How should we collaborate with AI?"

1. *"Learning how to learn"* rather than "knowledge itself": Scrutinize sources, basis, and biases, grasp the limits of one's own understanding, get help from AI, verbalize and reflect on judgments/values, look back on the learning process, and explore other perspectives.
2. *Creative thinking and expressive power*: AI is poor at "creating new value" and "discovering meaning," so use AI to explore diverse expressions (language, video, apps, art, etc.) for real-world issues, verify the problem setting itself, revise it, and clarify the basis of value judgments.
3. *Ethics, philosophy, and social responsibility*: Understand diverse perspectives and individual dignity , and emphasize settings for thinking about and discussing what kind of society and way of life each person aims for.
4. *Collaboration skills and ability to foster trust*: Promote global learning with AI while fostering intercultural understanding, and cultivate the ability to think with others and build trust .
5. *Basic literacy + Digital/AI literacy*: Understand the cognitive habits of AI based on data, and think together with AI about the "structural

AI Education and Christian Principles

Mark 12:28b-31, Japan Bible Society Common Translation

"Which commandment is the most important of all?" Jesus answered, "The first is, 'Hear, O Israel: the Lord our God, the Lord is one; you shall love the Lord your God with all your heart, and with all your soul, and with all your mind, and with all your strength.' The second is this: 'You shall love your neighbor as yourself.' There is no other commandment greater than these."

Keiwa: Love God and Love Your Neighbor ∼ Respect God and Harmonize with Your Neighbor

- To cherish someone important is to cherish the people important to that important person.
- To cherish your important person is to cherish the important people of your important person.
- "Tell me about yourself." Even when we must keep a distance, unable to welcome our neighbor.

The setting of Christian education can provide deep understanding and practice based on human value, responsibility, and love.

Why not try using AI?

The First Step

- Poe (URL: https://poe.com): Almost all public AIs like ChatGPT, Google Gemini, and Perplexity are available on the web, mobile app, and PC app.
- ChatGPT (Currently GPT 5.1): https://chatgpt.com
- Google Gemini (Currently Gemini 3): https://gemini.google.com/app

Things I didn't introduce: Convenience will be filtered out!?

- Limiting reference data: Google Notebook LM
- Learning Mode: ChatGPT's Study Mode, Gemini's Guided Learning Mode selectable from Tools
- Pro version trial: Google AI Studio
- Utilization of AI in a Web Browser

Finally, I have included links to the conversations I had with AI during the preparation of this lecture as references.

Conclusion

The Middle Schooler I talked about initially: Was working on *Prompt Engineering*

Prompt = The instruction or question text input to the AI

- So that a middle school student can understand.
- In the language of a middle school student.
- Summarized to about 800 characters.

Since AI understands the *Context*, giving an instruction for the response at the beginning will lead it to respond in a form closer to what you want.

At Keiwa Gakuen

- Keiwa Gakuen University: Notes on the Use of Generative AI
- The use of AI is essential but difficult for students/pupils in the world they will live in, and there are individual and environmental gaps. It is better to have the experience of thinking and learning together, including the experience of making mistakes, such as ethical issues that hurt the dignity of others, inappropriate use that doesn't lead to learning. Teachers have a role in helping learning, discovering mistakes, or advising on deeper questions.

Reference Examples

After deciding the outline, I checked the content with ChatGPT. After creating the script and slides, I used Gemini to confirm the content.

ChatGPT: GPT5.0

- Turing Test
- What is intelligence?
- Human Limitations and the Ethics of Artificial Intelligence
- What is a prompt?
- Evolution and Current State of AI
- Hopes and Risks of AGI
- Designing the Future of Education
- AI education and Christian schooling

Google Gemini: Gemini 2.5 flash

- What Matters in the Age of AI

Thank you for listening

Thank You for Listening!

Suzuki's HP

Slides [PDF]

Suzuki's HP URL:
https://icu-hsuzuki.github.io/science/index.html
Slides PDF URL:
https:
//icu-hsuzuki.github.io/science/gospel/keiwa_ai_slides-e.pdf

I welcome your comments. Email: keiwa.hsuzuki@gmail.com

Advice from People Around Me

- It has already become a part of the social infrastructure and is expanding
- Consider large individual differences: Digital Divide, whether it can be taken as one's own concern
- Educational reform is considered essential, but how to change is in the experimental stage
- Not control, but support learning for social adaptation while learning technical things together
- Conversely, will the value of handmade things and the importance of trust between humans be re-evaluated?
- The important thing is the resolve to use it as a means to *think with your own brain*
  - Should not be used to ask AI for the answer. (Not using one's own head)
  - Should not put AI's answer (even if modified) into one's own words. (Tends to feel like one's own idea)
  - It is okay to get an outline of what one doesn't understand, or confirm something one slightly knows.
- Firmly hold one's own MVV (Mission (Why), Vision (What), Value (How)) and use AI while checking against it, and also review the MVV.

Educational Objectives of the Department of Liberal Arts and Sciences

To achieve the vision of "nurturing conscientious citizens who serve their neighbors and bear responsibility for a sustainable society, and contribute to local and international communities," we foster an attitude of respect for human dignity and human rights, and cultivate fundamental knowledge in language, quantitative reasoning, and ICT, as well as specialized knowledge in their fields. We nurture intercultural understanding that enables coexistence with diverse people from a global perspective. Furthermore, we develop the ability to think critically and analytically based on these, and to express clearly and effectively using language and digital technology, thereby nurturing human resources who can contribute to the formation and development of a sustainable society with high ethical standards. Approved by the Board of Directors, 2025/11/27

Can you imagine specific initiatives directed toward this objective!?

Educational Objectives of Keiwa Gakuen High School?

In this era of change, why not verbalize what has been valued and what will continue to be valued in the excellent education provided since 1968, which has sent out wonderful graduates?