Some Preliminary Ideas on
Seamless Interest-Driven Co-Creator Theory (SIDC Theory)
& Global 'Harwell' Goal

This rough and incomplete document puts together a set of preliminary ideas related to SIDC Theory and the probable pursuit of Global Harwell Goal

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Involving a wide range of aspects, design of learning activities, tools, and environments in the digital future requires a theory to guide its development. A theory, based on various research, experimentation, and observation, consists of a set of hypotheses. These hypotheses demand continuous research to test, verify, revise, or even be denied. Yet, a theory provides direction for research and practice to move forward to the targeted goal.

Seamless Learning

One-to-one (1:1) technology enhanced learning (TEL) refers to the availability of one device or more per student for supporting learning. Today, this has become a reality for most countries after the COVID-19 pandemic. In the early 2000s, noticing the advent of mobile devices and large online learning communities, researchers started to experiment on 1:1 TEL. The concept of 1:1 TEL, however, does not suffice to describe such emergent learning environment and tools. A holistic concept is desirable, and it needs two more concepts: learning scenario and seamless learning space. *Learning scenario* refers to various learning environments supported by 1:1 technology, which include "learning individually, with another student, a small group, or a large online community, with possible involvement of teachers, mentors, parents, librarians, workplace professionals, and members of other supportive communities, face-to-face or at a distance in places such as classroom, campus, home, workplace, zoo, park, and outdoors." *Seamless learning space* then refers to the collection of various learning scenarios supported by 1:1 technology, the product: Social Space X Physical Space X Virtual Space. Finally, the holistic concept of *seamless learning* spells out the continuality of learning experience while students switching from one scenario to another in the seamless learning space easily and quickly via 1:1 technology.

Interest-Driven Creator Theory (IDC Theory)

IDC Theory intends to guide future learning design, lessening the adverse effect of examination-driven education to our students by learning more effectively and

enjoyably, and better preparing them for the future unpredictable world. The theory puts forward the following hypotheses:

1. Learning a domain can be viewed as the development of different stages of interest in the domain from situational interest to individual interest (we may revise this from *situational interest* to *enduring interest* and to *self-pursuit interest*).
2. The learning activities can be designed as creation activities of the domain. This is done by decomposing the creation activity into imitating, combining, and staging components (*creation loop*).
3. To nurture the interest of the domain, the creation activities, according to the different stages of interest development of the domain, can be designed as interest-driven creation activities. This is done by incorporating creation loop with *interest loop*, which consists of curiosity, immersion, and meaningfulness components.
4. To assure continuous development of interest in the domain and the lasting effect, interest-driven creation activities need to be incorporated into the daily routines. Thus, students can form habit of learning through these daily creation activities. As a result, student feels a sense of harmony such as inner peace, satisfaction, and achievement. This is done by embedding the interest-driven creation activities into *habit loop*, which consists of cuing environment, routine, and harmony components.

Assuming that the aforesaid hypotheses are valid, we arrive at the following expected outcomes:

i. Students will enjoy and endeavor to learn.
ii. Students will excel in terms of learning performance, and thus, will be prepared for high-stakes examinations.
iii. Students will develop twenty-first century competencies and prepare the foundations for lifelong learning.
iv. Students will explore and develop their potential and talents.

IDC Theory is both a theory of how people learn and a theory of designing learning activities. Furthermore, given its broad scope, it may be able to include and explain some other theories of learning, and, by linking or integrating other theories, this holistic theory will gradually become a comprehensive theory.

Seamless Interest-Driven Co-Creator Theory (SIDC Theory)

SIDC Theory is simply a theory about continuity of IDC-based learning in the

future seamless learning space (or more specifically, "seamless AI world", see keynote presentation at MetaACES) but its scope and implications will be considerably larger when considering the questions raised in the summary above. Furthermore, to enhance harmonious culture development during learning process, we emphasize collaboration and co-presence in the learning environment. Thus, we slightly change the name of *Interest-Driven Creator Theory (IDC Theory)* to *Interest-Driven Co-Creator Theory (also IDC Theory).* In fact, "School is a social institution… even though interest and habit are usually considered to be characteristics exhibited by individuals, they can also be regarded as characteristics possessed by groups: We can talk about a group's interests and a group's habits." As for creation, however, there are two possibilities: individual creation or group creation. If we take collaborative writing as an example, it is clear that "…if we consider the final creative product (of writing) and the whole process of creating it from beginning to end, the writing task is likely to involve both individual and group creations." (Chan, et al., 2018) A slight change of a name could mean a substantial change in emphases: We shall then talk more about co-interest, co-creation, and co-habit in SIDC Theory.

Besides, we are also thinking for a provisional framework of SIDC Theory, which is outlined in the keynote presentation at MetaACES2023.

Metaverse and the Seamless World

The Internet has been evolving over three periods. The network system was born in early 1970s. The first two decades, the 1970s and 1980s, was the *sprouting* period of Internet, in which the network system was first used for military purpose and then for research exchanges among the academic community in the USA. In the subsequent three decades, from the 1990s to 2010s, was the *growing* period, in which there was a rapid growth of users due to its opening to commercial use. In this period, gurus of the Internet companies such as Amazon and Google emerged.

Starting from this decade, the advent of metaverse marks the inception of the third period of the Internet, the *flourishing* period. Metaverse can be simply defined as "a three-dimensional online environment in which users represented by avatars interact with each other in virtual spaces decoupled from the real physical world." (Ritterbusch &Teichmann, 2023) However, whether it is called metaverse or some other names, the reason for the emergence of the *flourishing* period is obvious: the Internet integrates various technologies such as mobile computing, cloud computing, big data, machine learning, natural language processing, voice and image processing, robot, IoT, VR/AR/MR, online games, 5G/6G, low orbit satellite communications, blockchain, non-fungible tokens, and others. Dependently or independently, these technologies

have been developed for years. Hence, the Internet can also be viewed as a ‘container’ storing all human information and a ‘platform’ for nurturing synergies of all these digital technologies, explaining why the power of the Internet boosts exponentially in recent years. This trend will continue.

The recent surge of interest in metaverse sparks a broader and deeper understanding of seamless learning space. Before we go further, originating from the user immersion in social media and video games hours a day (Rajan et al., 2018), we should note that despite all potential benefits of metaverse, user addiction and safety within metaverse are still the concerns.

In 2010, an article entitled "How East Asian classrooms may change over the next 20 years” (Chan, 2010), the opening sentence of the paper stated: "Unless all parents work from home in future, unless the broadband of the future allows the interaction of computer-interface-to-computer-interface beyond face-to-face interaction, schools will continue. Even if the two preceding “unless” conditions are met, schools will continue; this is because there will be so many virtual worlds in the future, allowing children to plunge into or stay inside, making school the most precious place for nurturing children in facing the real world. Schools will not disappear but change." Coincidently, no need to wait for 20 years, in the 10th year after 2010, that is, 2020, the COVID-19 attacked, almost all parents were working from home, video conferences were used so often, and 5G/6G were developed so rapidly, including the current metaverse technology, making the interaction of computer-interface-to-computer-interface closer to face-to-face interaction. Yet, in this 3-year-experiment during pandemic, educators and parents find that online learning cannot replace physical school learning, no matter how powerful the future technology is. Face-to-face social interaction and development of genuine and positive human relationship must be an integral part of education,

In Wang’s keynote at the Workshop of MetaACES2022, he broadly defines *metaverse* as the following:

> *Metaverse is an interconnected digital world that seamlessly integrates physical and virtual spaces.*

In view of this definition of metaverse, we may define *seamless world* as the following:

> *Seamless world is a physical world that seamlessly integrates physical and virtual spaces.*

Therefore, metaverse sets off from virtual world while seamless world adheres to

physical world. They are two close concepts with different emphases. *We prefer seamless world to represent our digital future.*

Artificial companions and their support for SIDC learning

The current surge of interest in ChatGPT signals the arrival of AI era to the public. Computer scientists may speculate that the Turing Test, a test proposed by Alan Turing in 1950 that examines whether the computer can demonstrate intelligent behavior equivalent to that of a human, may soon be passed.

Let us go back to the history of computer. The first computer was invented in 1946. Scientists since then explored its potential applications. Remember that the most basic operations of the computer are dealing with '0' and '1', the binary number system. Therefore, the most obvious application was numerical computation. Researchers, however, soon realized that the computer was not only a computing machine for science and engineering applications, but also for information storage and human communication. In short,

Computer = *Computation* + *Information* + *Communication*

Beyond the basic operations of binary digits of '0' and '1' and the power of computation, information storage, and communication, scientists naturally thought about 'intelligence' of such machine. Since the proposal of Turing Test, the idea of 'artificial intelligence' had drawn attention of the trailblazers of this new research area in 1950s.

Like the Internet, AI development has been going through three periods. The first was the *visionary* period, going through three decades: from the 1960s to the 1980s. During this period, numerous ideas and prototypes were spawned. By the end of this period, some funding agents regarded AI research as over expectation but under realization. The second period, three decades from the 1990s to the 2010s, was the *winter* period. During this period, AI researchers continued to conduct basic research such as robot technology, machine learning, natural language processing, and many others, but in a low-profile way compared to the visionary period. However, in this winter period of AI, the Internet, in its growth period, bloomed, almost serving as the storage of all human information and knowledge required for the successful development of many AI technologies. Thus, even though AI was in the winter period, AI technologies were maturing, and that was why AlphaGo, Siri, robots, driverless vehicles, and others emerged by the end of 2010s. Starting from this decade, AI has begun its *flourishing* period, reviving and thriving.

One may ask: Was there a dream of AI for education comparable to the Turing Test? Yes, it was the *intelligent tutoring system (ITS)*. The first intelligent tutoring system, developed in 1970 (Carbonell, 1970), was to emulate a private tutor interacting with the student. This pioneering work drew the attention of many early researchers of this new field, especially when it was found that one-to-one individualized human tutoring considerably outperforms the traditional one-to-many classroom teaching by 2-sigma (Bloom, 1984). In 1988, thinking about the potential application of *machine learning* in education, being inspired by the idea of learning *companionship* in ancient China, and trying to investigate how a learning companion might stimulate the student to learn better, Chan and Baskin (1988) proposed another genus of AI supported learning system called the *learning companion system (LCS)*. Three characters are involved in such a system: the human student, the computer learning companion, and the computer teacher. The computer learning companion acts as a learning companion for the student. For this purpose, the companion learns to perform the learning task at the same level as the student, and both students can exchange ideas while being presented the same material. "Simulating skill acquisition and actual machine learning are two different approaches to designing the companion portion of the LCS. In the first approach, the performance capability of the companion is controlled by the system (via symbolic AI); in the second approach, the companion is required to be able to learn as the student does by using machine learning techniques." Due to the limitation of machine learning techniques then, Integration-Kid (Chan, 1991), the first prototype of LCS, adopted the simulation approach by deploying a rule-based system, a classical knowledge representation. Thereafter, Chan and his colleagues conducted a series of research by building a networked learning environment in which students interacted with real human companions and simulated companions. In the network environment, a learning companion may be a collaborator, competitor, peer tutor, peer tutee, and even an animal companion or robot companion (references). In the 1990s, there was abundant research on learning companions, sometimes using different jargons such as 'simulated student', 'pedagogical agent', 'affective learning companion' and so forth, besides 'learning companion' (references).

In the 2020s, the flourishing periods of the Internet and AI overlap; digital technologies unify, and the biggest impact on human beings, perhaps, is the emergence of artificial companions in the form of connected virtual characters and tangible robots.

Artificial Companion = Internet Information + Personal Lifetime Profiles

Based on SIDC Theory, SIDC learning is a model of learning activity that focuses on student's interest development of a given domain by exercising interest-driven creation loop habitually while such learning can continue in different learning scenarios

in the digital-supported seamless world. The design of artificial companions, also based on SIDC Theory, aims to support and enhance SIDC learning in the seamless world effectively.

Furthermore, we should note that artificial companions around us in the future not only support our learning, but also assist our diet, exercise, shopping, entertainment, and other daily activities.

The Seamless AI World

The powers of AI, including robot and other related technologies, are inevitably and rapidly increasing. As a result, *everything can be resembled, resembling humans, resembling things, resembling activities (events) in the virtual, physical, or mixed world*. We collectively call this phenomenon 'digital resemblance', which, to some extent, explains why we have online games, AR/VR/MR, the metaverse, artificial companions, and so forth today. For artificial companions, they will resemble not only one's appearance, expression, and intellect, but also the person's emotion, social relationship, and value system. Ultimately, our seamless world is filled with digital resemblance of things in the real world as well as AI supported tools and objects. We refer such digital future world as the Seamless AI World (or SAI-World or 'Saiworld').

Global 'Harwell' Goal (GHG)

While the whole world worries about the dark side of AI and the Metaverse, we, as educators of next generation, should view from the bright side of the Seamless AI World and take this as a precious opportunity to change our world for better.

Harwell is a portmanteau of two words: harmony and well-being.

In his keynote in AIED2007, Chan described four problems in technology enhanced learning, namely, the *productivity* problem, the *school restructuring* problem, the *personalized curriculum* problem, and the *global educational goal* problem. He explained the first three problems in detail but the last one. For the last problem, He suggested researchers to rethink the educational goal from the global perspective: "Well-being of humankind is threatened by nuclear holocaust, earth resource exhaustion, mass-extinction of species, and polarization of the society. The globe is at stack! 'Until our own generation, no one had grounds to worry whether the next human generation would survive or enjoy a planet worth living on.' (Jared Diamond, 1992) We

researchers are the designers of the education and hence the future society. We are very powerful, too powerful! What does human nature constitute? Edward Wilson gave his answer: heredity, development, aggression, sex, altruism, and religion. (Wilson, 1978) But now we find many online games address wealth, fame, and power in the process of building players' identity. Such online games when used for learning must affect extensively our students' value system." Finally, Chan asked: "What is this global educational goal? What should we do for the global educational goal problem?" He had no answer but said: "It must be a global, collective endeavor!"

The small group of international researchers had preliminary discussion on this topic. Based on our experience in building IDC Theory and its practice, we think that the two concepts, 'harmony' and 'well-being', should be both included in the global educational goal. Thus, we have Global Harwell Goal, which means Global Harmony and Well-being Goal.

Harmony, in the original IDC Theory "refers to the affective outcome of the routine activity as well as the integration or stabilization of habit…..In harmony, people may feel a sense of enjoyment, pleasure, fulfillment, satisfaction, achievement, and ultimately inner peace. Such feeling of harmony is usually coupled with their feeling of peacefulness about surrounding environment, composing people and objects they interact when they activate the routine behavior." (Chen, et al., 2020)

When a group of researchers in Taiwan established and operated a small IDC experimental site with around 90 elementary-school-level students (Looi…), they found that the experimental site needs to state its core values so that teachers, students, and parents can follow and pursue. Initially they chose ICE^2: integrity, collaboration, equity, innovation, commitment, and environment. To align with IDC Theory's expected outcomes and be more inclusive, they further stated three types of harmony:

> *Humanity Harmony:* This is harmony with other people. Here 'other people' include your family members, your friends, people you do not know in your society or country, as well as all people in the world. Humanity harmony refers to a state of mutual agreement and understanding between people, those you know or do not know. It goes beyond interpersonal relationship, promoting equity, supporting inclusiveness. Encouraging collaboration by finding balance between different views and working towards common goal, humanity harmony is not about avoiding conflict or differences but achieving a balance that advocates growth and productivity. To reflect the essence of humanity harmony, the goals——bettering yourself, nurturing a

caring family, incubating a humane society, and fostering the peaceful and collaborative globe——should be achieved from inside (individual) to outside (the globe), and simultaneously from outside to inside.

Environmental Harmony: This is harmony with the environment. It refers to the balance of human needs and environmental preservation. Thus, scientists examine the circular economy models in reducing waste and promoting resource efficiency (Jones et al. 2021). Urban planners focus on designing green spaces, sustainable transportation systems, and energy-efficient buildings (Newman & Kenworthy, 2021). Ecologists study the balance and interconnectedness of all living things as well as the interdependence of different species and ecosystems (Sala, et al., 2000). Interestingly, Wilson (1984) pointed out that there is humans' innate love for nature and living things, and Kaplan (2018) indicated that exposure to natural environments can reduce stress and improve mental health. Both of them suggested that harmonious interactions with natural environment are beneficial to human life. Broadly speaking, environmental harmony involves exploring sustainable practices, promoting ecological balance, and fostering a healthier relationship between humans and the natural world.

Inner Harmony: This is harmony within oneself. It refers to a state of balance or congruence between one's thoughts, feelings, and actions. It involves finding a sense of unity and coherence within oneself and the world around us, feeling inner peace, self-acceptance, and contentment. Inner harmony does not necessarily mean the absence of conflict or stress, but rather the capacity to effectively manage and integrate different aspects of one's experience.

In conclusion, harmony, whether it is our interactions with others, in the world around us, or in our minds is a state of balance and congruity that we strive for.

During Covid-19, most schools were closed, students learning online from home. Researchers concerned about well-being of students in their learning process, besides academic performance. Developed by positive psychology pioneer Martin Seligman (2012), the PERMA model is being frequently adopted by researchers in studying and accessing well-being. PERMA outlines five elements:

Positive Emotion: Experiencing and fostering positive feelings

like joy, gratitude, hope, and love, enhancing overall happiness.

Engagement: The state of 'flow' when one is fully absorbed and deeply satisfied in participated activities, promoting a sense of fulfillment.

Relationships: Positive relationships with family, friends, or community that provide essential support, shared experiences, and a sense of belonging.

Meaning: A sense of purpose in life, often derived from contributing to something larger than oneself, adding context to life experiences.

Accomplishment: The pursuit of personal goals or professional success, contributing to self-esteem and a sense of progress.

Fortuitously, IDC Theory captures some core elements of the PERMA model. When treating learning as development of interest, learning must be enjoyable, experiencing ‘positive emotion’ such as hope, pride, and amusement. In the learning process, which is also the creation process, students focus their attention at their tasks, ‘engaging’ deeply in the process (the state of ‘flow’). IDC Theory encourages group learning and development of group interest, group creation, and group habit, supporting them to build their ‘positive relationship’ with their peers and teachers. Meaningfulness, a component of interest loop in the original IDC Theory, however, is different from the element ‘meaning’ in the PERMA model. SIDC Theory will involve extension of IDC Theory per se, and incorporation of ‘meaning’ will then be taken into consideration. Finally, staging, a component in the creation loop, is the same as ‘accomplishment’.

While harmony and well-being are interconnected and sometimes used interchangeably. For example, both concerns social relationships, where it refers to peaceful and cooperative interactions. They are, however, distinct concepts. Harmony, originating from the Greek 'harmonia' meaning 'agreement' or 'fit', is a term often used in the context of balance, unity, and peaceful co-existence. Well-being, however, is a more comprehensive term that encompasses multiple aspects of an individual's life, including physical health, mental health, social connections, and a sense of purpose and accomplishment.

For people from all walks of life, it is worth noting that harmony is mostly referred as a peaceful and collaborative society while well-being is regarded as what an individual will usually pursue for the betterment of life. However, without a harmonious society or world, the pursuit of individual well-being almost becomes impossible.

Harmony is the prerequisite for well-being.

Thus, ‘Global Harmony and Well-being Goal’, or more succinctly, the Global ‘Harwell’ Goal, is likely the global educational goal we should strive for. This embodies our aspiration for a world where harmony and well-being are not just ideals, but realities for all.

The mission of AI and the Metaverse’s existence: Achieving the GHG

Artificial Intelligence (AI) has been celebrated as a revolutionary and transformative force in the world. As AI's sophistication and ubiquity increase, the voices cautioning against the possible risks inherent in its development and deployment are even louder. Stephen Hawking, a renowned theoretical physicist, said that the development of artificial intelligence could spell the end of the human race, while Elon Musk, the founder of Tesla and SpaceX, warned that AI scares him, its capability more than almost anyone knows, and the rate of improvement exponential.

AI’s potential risks such as job loss due to automation, privacy violations, deepfakes, algorithmic biases from flawed data, increased socioeconomic inequalities, market instability, and unmonitored weapon automation are drawing intensive attention. Worry of humans losing control over AI and its objectives is climbing. The question of who develops AI and for what purposes intensifies these concerns. By addressing its potential dangers and establishing effective regulations can prevent dire consequences in the future.

The metaverse, a convergence of the internet and VR/AR/MR technologies, is a leap how we communicate. This concept of a one-stop virtual world or "global village" radically transforms our perception of the world. Within the metaverse, social interactions take on new dimensions as people can spend time with friends, attend concerts as digital avatars, or engage in immersive gaming experiences. In the realm of commerce, the metaverse offers potential customers the chance to virtually explore real estate, consumer electronics, and fashion items before making a purchase decision. This simulated interaction allows for a more thorough evaluation of products, enhancing the overall shopping experience. Education benefits from the metaverse as well. Students can embark on virtual tours of places like the Amazon Rainforest or explore celestial bodies they are curious about, thereby transforming the learning experience into an immersive journey of discovery. Overall, the metaverse represents a parallel reality with boundless potential.

When virtual environments within metaverse become increasingly hyper-realistic,

there is a concern that the real world might fail to offer the same level of mental stimulation in comparison to the virtual realm. Additionally, the metaverse, with its several times the engagement capacity potential compared to current social media, carries the risk of extreme addiction, leading to reduced physical activity, increased isolation, and even depression.

Just as with AI, it is important to anticipate the potential dangers of the metaverse and establish appropriate regulations. Implementing actionable rules and ensuring safety can help minimize any harmful effects that may arise from excessive or unregulated the metaverse usage. By doing so, we can harness the transformative power of the metaverse while safeguarding the mental and physical health of its users.

Now, it is not surprising that one might wonder the mission behind the existence of AI and metaverse technologies. Besides establishing regulations to prevent potential misuse, we can advocate globally for researchers and practitioners in our field to engage in the development and deployment of these technologies for achieving the global education goal: GHG.

However, it should be noted that the GHG is not just an educational goal; it is a far-reaching goal for humanity as a whole. By promoting the idea worldwide that the mission of existence of these powerful technologies is to achieve the GHG, we can enhance public awareness of their potential benefits and pitfalls. Indeed, if we can identify early on their beneficial applications for humanity, we can also identify early their potential dangers. This foresight would allow society to heed warnings and mitigate potential harm before it becomes a serious issue. In essence, the more people involve their positive development and deployment, the more people realize their upsides; thus, more people, and hence the greater collective power, confine their downsides.

In short, we should advocate that the mission of existence of these powerful digital technologies is to achieve the GHG. We can start with education.

Defining ‘seamlessness’ in the seamless AI world?

In the seamless world, everything is connected to everything through data connection via Internet. This is because the Internet can access all data storages that it can assess. Therefore, the Internet becomes the world’s largest ‘data reservoir’. Furthermore,

Before we go further, we define 'seamlessness' as follows:

> *Seamlessness refers to the impact caused by data connection of or digital resemblance among humans, things, or activities. Depending on whether the impact is positive or negative, seamlessness can either be well-seamlessness or ill-seamlessness, respectively.*

We describe several types of seamlessness here. The first type of seamlessness—the *continuity of learning* while switching easily and quickly from one scenario to another in the seamless world—is described in the original definition of seamless learning (Chan, et al., 2006). This is mainly caused by data connectedness among different learning scenarios. Seamless learning substantially extends our traditional view on learning.

Again, the second type of seamlessness is the 'continuity', not only for learning, but also for other daily activities. Like seamless learning, we can continue to work (seamless world), continue our entertainment (seamless entertainment), continue our family life (seamless family life) and so on. Such phenomena are happening now because, again, we use the similar set of digital tools to support our daily activities.

The third type of seamlessness is the 'blurring' of IDC learning and other daily creation activities. The central idea of IDC learning is to treat learning as creation activity consisting of components: imitating, combining, and staging. Then the point is how to make these components interesting in our design. Besides learning, we can also decompose speaking (Chan, et al., 2018), cooking, and other activities into imitating, combining, and staging components and try to make them interesting. We then speculate the extrapolation: could there be IDC work, IDC entertainment, IDC family activities, and other daily activities? If this is the case, in the seamless world, most of our activities could be designed as SIDC activities.

The fourth type of seamlessness is multitasking—doing multiple tasks at the same time by frequently switching back and forth between the tasks at our fingertips. Multitasking occurs because we use similar set of digital tools to work on multiple tasks, and hence data connection among these tasks. However, researchers find that multitasking usually leads to decreased productivity and increased stress (Meijden & Mulder, 2017; Rosen, Carrier & Cheever, 2013).

Not all seamlessness is good. Multitasking is an example of *ill-seamlessness*. This indicates that searching well-seamlessness while avoiding ill-seamlessness will be our perpetual endeavor in the digital future.

The fifth type is the seamlessness between human and artificial companion, which is caused by digital resemblance. More and more robots, chatbots, driverless cars, and other artificial humanoids (some are animal-like) are around us. If any of these humanoids are constructed as artificial companions, one may then ask whether it is possible that a person's best friend is the person's artificial companion rather than a human friend. Various complex issues may then emerge.

However, if we adopt Global Harwell as the global educational goal, then the seamlessness between student and artificial companion will be the enhancement of Global Harwell of each student. Starting with education, in the long run, we may build the Global Harwell Globe, a better place for us and our next generations to live.

A Preliminary Framework of SIDC Theory

…see ppt of MetaACES keynote by Chan…

Global Harwell Goal Manifesto?

We are planning to have a special issue in the RPTEL journal after a series of academic activities in a year and so for discussing SIDC Theory and the GHG. One of the papers, we hope, will be the Global Harwell Goal Manifesto. Furthermore, in this manifesto, to support the advancement as well as dissemination of the mission——achieving GHG through SIDC theory and practice——we shall advocate the establishment of SIDC model sites in different countries and regions to form a connected 'Global SIDC Park' to demonstrate the learning and life of 2040 to the world.

Final remark

Based on a small group of international researchers' ongoing discussion, this keynote proposes that we may be able to develop SIDC Theory, and its research and practice could be a means to achieve the GHG.

Nevertheless, from who we are to who they will be, from where we are to where they will be, education steers the path. Being researchers of this area, we are the designers of the future. We must ask whether we can act together to make our world a place with global harmony and well-being.

References

……to be added……