WIIFM: Absorptive capacity for digital natives in explorative space and tech education for survival in the virtual world

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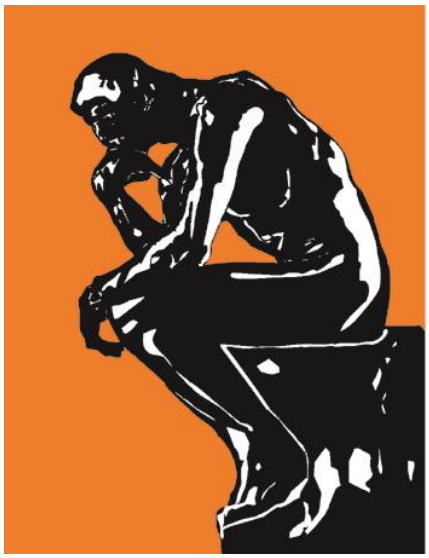

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Abstract

Humankind is facing many existential global problems that require international and transgenerational efforts to be solved. Preparing our next generation with sufficient knowledge and skills to deal with such problems is imperative. Fortunately, the digital environment provides foundational conditions for children's and adolescents' exploration and self-learning, which might help them cultivate the necessary knowledge and skills for future survival. We conducted the Bayesian Mindsponge Framework (BMF) analytics on a dataset of 2069 students from 54 Vietnamese elementary, secondary, and high schools to test this presumption. The results showed that students with higher digital literacy are more curious and have better knowledge regarding global issues (i.e., climate change, disease, overpopulation, aging, etc.). Students' curiosity also mediates the relationship between digital literacy and global issues knowledge. Based on these findings, we argue that digital explorative space is essential for digital natives' education for survival, individually (i.e., for future employment requirements) and socially (i.e., for making informed decisions and creating innovations that can be helpful to society). Children's and adolescents' exposure to digital explorative space should be promoted to improve their digital literacy rather than prohibition. During the exploration, emotional intelligence is critical in mitigating existential risks, or threats, to digital natives to navigate and overcome chaotic processes occurring in unchartered waters in the virtual world.

* WIIFM: The age-old acronym (What's in it for me) seems to flourish everywhere in today's virtual world, especially for digital natives

Keywords: digital literacy; emotional intelligence; digital explorative space; curiosity; information processing; Mindsponge Theory; knowledge cultivation

> "The kids should learn to fly, sharpen their eyes and beaks, and strengthen their wings and muscles."
>
> In "Food"; *The Kingfisher Story Collection* (2022)

1. Introduction

1.1. What is in the digital space for the youth?

In the *Illiad* of Homer, the Greek warrior Achilles, half-god himself, was told by his mother, Thetis, that fate has given him two options—either live a short but glorious life in Troy or stay in Phthia and live on in old age but obscurity. As he confronts this choice, the promise of peaceful yet quiet life does not interest him, and he decides to head to Troy. While the decision appears to be easily made by Achilles, this anecdote presents a dilemma in life that young individuals face, and, unsurprisingly, the young, the brave, and, more often than not,

the restless seem to choose to venture out of their comfort zone to explore the world. This has never been truer in the digital age, when children can navigate their lives from an early age thanks to cutting-edge technology. Their adventure sometimes drifts their mentality so far away from home that a distinguished mother of this New Age, an Oscar award winner, Kate Winslet, hopelessly screams out: "*We want our children back*" (Salisbury, 2023).

But what is in the digital world for our children to be exposed to such risks?

The digital space offers children opportunities to broaden their knowledge and acquire necessary skills that could not be imagined before. Children and adolescents need such knowledge and skills to survive in the new era, individually and collectively.

From the individual perspective, the labor market is increasingly dependent on information technology (IT). Due to the incredibly vast amount of information in the human infosphere, automated processing and digital memory storage are indispensable. Thus, more and more functions in society will require familiarity, intricate knowledge, and practical skills in dealing with automation and new digital platforms (Anshari, Syafrudin, & Fitriyani, 2022). IT employment in the United States exceeded three million people in 2022 and is expected to pass six million people in 2023 (Sava, 2023). Companies are demanding more technology-capable employees and putting pressure on the education system to adapt in multiple aspects to keep up with employability (Goulart, Liboni, & Cezarino, 2022). More jobs involving the digital space will appear, as more jobs without such involvement will disappear. The faster the technological advancement is, the stronger this tendency is expressed in reality. Children today need to prepare their digital knowledge and skills to function well in the world of the near future. It is a financially competitive edge at the moment, and it will be an almost absolute necessity for survival in the coming time.

From the collective perspective, human society is facing various problems that can hinder sustainable development and even threaten the existence of humankind. They include but are not limited to climate change, depletion of environmental resources, diseases, inequality, overpopulation, poverty, military conflicts, etc. Those issues are becoming increasingly complex, interconnected, and important, and they require transnational or global responses, as individual governments lack the capacity to solve them (Hosack, 2011). Some global problems are pressing and require long-term resolutions that can last for generations, not just several years. Besides being a part of society's collective decision-making process in the future, the youth would also be those that would suffer the consequences of problems existing at the moment. For example, if the climate tipping point is exceeded, global cascades will happen, leading to a future dominated by natural disasters, heat waves, storms, and floods, or even the 6th mass extinction (Kolbert, 2014; Lenton, et al., 2019). When aware and knowledgeable about the problems, the youth in some countries even strive to foster society and policymakers to adopt agendas that can help solve global problems (i.e., climate change

prevention and racial discrimination elimination agendas) (Editorial, 2021; The Office of the High Commissioner for Human Rights, 2021).

Given the complexity and variety of problems that the youth have to deal with, they require a substantial amount of knowledge and skills, which seem to be limited in the general curriculum of the K-12 educational system. As of the middle of 2023, it is hard to find educators confident that they are more knowledgeable and have better educational capabilities than the most advanced Large Language Models (LLMs) recently developed, like ChatGPT and Google Bard. Face-to-face, not many people can provide students with the same level of detailed and updated information, theoretically constant availability, multilingual support, ensured attentiveness, emotional stability, etc., as Internet-accessed educational artificial intelligence (AI) does. Notably, this is just the beginning of the current explosive progress in information technology and especially AI applications in education.

To truly and freely love is to accept necessary vulnerability. Humanity is currently living in the days of rapid evolution. The new digital space is like an unexplored, mysterious ocean of wonder and awe. To find and actualize the true potential of human advancement, as a species, we need brave and capable pioneers. If we create a protective bubble and keep those explorers inside, who will go out there and become the navigators for the human race? And when the bubble finally bursts under the waves of progress, will our children have the skills to survive those uncharted waters?

As the infosphere of human society is fundamentally changing, a new education system needs to be developed for the new generations to adapt and thrive in the brave new world. Such a system must capitalize on the strengths of digital space for children's and adolescents' exploration and self-learning and safeguard them against the online world's perils. To help design and build a suitable education system in the age of digital discovery, the current study is dedicated to 1) providing evidence on how digital literacy can help improve children's and adolescents' curiosity and knowledge of global issues and 2) discussing how digital literacy improvement can help the digital natives withstand and overcome online risks while capitalizing on the digital space for their future survival.

1.2. Risks of learning in the digital environment

Learning is a direct way that the youth can become aware of global issues and relevant knowledge. During the K-12 education period, students' learning is usually based on the curriculum provided at school and family. However, widely available information communication technologies (ICTs) have made the Internet another major information source for students' learning process. Children and adolescents spend more time in the digital environment due to the rapidly growing social space (in the form of online gaming, communities, or networking) and opportunities for new skill development, identity experimentation, exploration, and the discovery of leisure activities (Keipi & Oksanen, 2014; Serapis, 2008; Valkenburg, Schouten, & Peter, 2005; Wellman & Haythornthwaite, 2008).

Multiple experts have even called the youth in the digital era "digital natives" or "the net generation" because of the substantial amount of time they spend on digital technology and media (Oblinger & Oblinger, 2005; Prensky, 2001). According to the International Telecommunication Union (ITU), 71% of the world's youth used the Internet in 2020, which was 1.24 times higher than the remaining population (International Telecommunication Union, 2023). In Vietnam, the Department of Children's Affairs estimated that 87% of adolescents between the age of 16-17 use the Internet with an average time of 5-7 hours per day (Quyen & Tam, 2023).

Apart from the benefits, digital space is also an environment associated with many risks, including cyberbullying, exposure to violence and pornography, gaming addiction, and echo chamber. Each type of risk can severely affect the children's physical and mental well-being and development. It is reported that technology addiction, cyber-bullying, or identity theft is exposed to more than half of 38,000 8–12-year-old children across 29 countries. Such cyber-related threats are more prevalent in Information and Communication Technology (ICT) emerging countries. Also, according to the 2018 DQ Impact Report, 68% of children in Vietnam were engaged in cyber risks (DQ Institute, 2018).

Cyberbullying refers to using technology to harass, intimidate, or embarrass someone online. It can have a significant negative impact on the development of psychological characteristics of children, including anxiety, depression, low self-esteem, and even suicide (Mazurchuk, Mazurchuk, Bratchikova, & Prospects", 2020). Violence and pornography in cyberspace refer to disseminating violent and pornographic content through the internet, which could lead to decreased mental health, sexism and objectification, sexual aggression, and adolescent dating violence (Rostad, et al., 2019; Unicef, 2023). School bullying or physical assaults on the street place a scar on our children's hearts. Domestic violence can traumatize them. Without physical contact, cyberbullying and toxic videos can also leave a similar spot in the children's souls or even hurt them more. As we are aware, there exist tragic cases of children committing suicide or engaging in violence merely after watching an online clip.

In a powerful way, we are astonished by many Hollywood movies about people losing their identity. Complete transcendence of the self occurs for such characters as in Mulholland Drive of David Lynch or Christopher Nolan's Memento and Inception where they completely forget who they are and why they exist. As fictional as those movies sound, they reflect a certain extent of reality: adolescents have to face the risks of identity theft when operating in the digital environment. They are more prone than adults to reveal their names, ages, addresses, and phone numbers over the Internet (Dowdell, 2011; Kierkegaard, 2008). As a result, adolescents are more likely to experience privacy invasion and hacking (Livingstone & Haddon, 2008). Even though cinematheque walks us through the cacophony of deepest emotions using its fiction, we hardly deny that extreme scenarios can happen to digital natives when they have an increasingly deeper bond to things and people in the digital world.

Emotional intelligence is critical in mitigating existential risks or threats, for children and adolescents to survive chaotic processes occurring in unchartered waters in the virtual world. This has now become an undeniable fact (Estévez, Cañas, & Estévez, 2020; Martínez-Monteagudo, Delgado, García-Fernández, & Rubio, 2019; Mavroveli, Petrides, Rieffe, & Bakker, 2007; Mikolajczak, Petrides, & Hurry, 2009; Park, 2018; Parker, Taylor, Eastabrook, Schell, & Wood, 2008). Recent evidence suggests that digital competence skills and knowledge positively predict digital emotional intelligence (Audrin & Audrin, 2023). Consistently, digital literacy is also found to improve children's digital resilience (Sage, Randolph, Fitch, & Sage, 2021), the individual's ability to withstand, overcome, and adapt to the adversities within the environment (Masten, 2007; Salignac, Marjolin, Reeve, & Muir, 2019; Sun, Yuan, Qian, He, & Luo, 2022). Therefore, digital literacy is imperative in fostering digital natives' knowledge absorption process and safeguarding against threats in the digital space.

1.3. Digital literacy: Navigation in an explorative space

The collective knowledge of human communities relies heavily on learning, particularly social learning, for our civilizations' development. Archeological evidence in human ancestry suggests that a significant rise in active novelty seeking (curiosity) around 75 thousand years ago caused a steep increase in cumulative culture, and subsequently, social learning and innovations (van Schaik, Pradhan, & Tennie, 2019). Human information-seeking capabilities evolved to effectively forage for sustenance in their surroundings due to biological survival needs in early eras, which led to how we have and use such skills in modern information environments (Sandstrom, 1994). In fact, information-seeking decisions in orangutans – a close genetic relative of humans – were found to exhibit a high level of cost-benefit evaluation and flexibility, comparable to human children (Marsh & MacDonald, 2012). Due to the importance of active information-seeking behavior in ensuring a species' survival and development in its environment, in the course of evolution, the brains of humans and animals utilize neural circuits for a sense of reward toward such activities (Bromberg-Martin & Monosov, 2020).

Despite some expressional changes, active information-seeking behaviors still play a crucial in the survival and development of humans naturally and socially. With the appearance of ICTs, information-seeking and exchanging activities have been much easier than ever before. The convenience, flexibility, and hyperconnectivity provided by ICTs (Morris & Rohs, 2021; Zhao, Lu, Wang, & Huang, 2011) are foundational for the self-exploration and self-learning of children and adolescents. The Internet allows children and adolescents to access a vast amount of information with minimal costs (i.e., a few clicks) at almost any time and place, making digital space a truly explorative space. Even the information that used to be inaccessible due to geographical and language barriers is also made readily available for learning thanks to advanced technological devices and translation software. With the knowledge and skills acquired from the digital explorative space, students can enrich their

understanding and create innovations that can contribute to society and solve existing problems (Vuong, 2022b). Indeed, it is not hard to find success stories of children and adolescents that make innovative content and tools that serve millions of people around the globe, such as Adam Hildreth with Dubit Limited (a social-networking website for teenagers) and Nick D'Aloisio with Summly (a web platform and smartphone application that provides algorithmically-generated summaries), etc.

However, acquiring digital literacy is imperative for operating, navigating, and learning in the digital explorative space. Digital literacy is generally explained based on the definition by Paul Gilster (Gilster, 1997). Gilster introduced the concept of digital literacy as the ability to understand and use information from various digital sources. Before Gilster, the term "digital literacy" had also been employed by several other authors who used the phrase to indicate the ability to read and comprehend information items in hypertext or multimedia formats (Bawden, 2001). However, Gilster's explanation of digital literacy is quite general and lacks lists of skills, competencies, and attitudes defining what it is to be digitally literate (Bawden, 2008). Thus, later scholars have proposed a list of core competencies to define digital literacy, which includes internet searching, hypertext navigation, knowledge assembly, and content evaluation (Bawden, 2008; Koltay, 2011). People with good digital literacy may adapt well to e-learning because they find it easier to comprehend educational technology and are more efficient and effective in information management (Mohammadyari & Singh, 2015).

Besides the formal learning space (i.e., where the pedagogical practices occur), digital literacy can also be employed and cultivated in informal spaces (i.e., where people engage with digital technologies and literacy). Those informal spaces include homes, libraries, museums, zoos and aquariums, clubs, sports teams, and online communities. Therefore, digital literacy "is not strictly about competence in school-based research tasks, it is about effectively participating in our new digital world" (Meyers, Erickson, & Small, 2013). With good digital literacy, students can not only conduct informal learning, which helps them obtain complementary and expansive knowledge but also engage in the activity of digital information creation (Meyers, et al., 2013). Through social networking sites like Youtube, students can also form a community and support other peers' informal learning (Tan, 2013). Exploration of the digital world now also includes unprecedented forms never experienced in former generations, such as Augmented Reality (AR) and Virtual Reality (VR). Students need digital literacy to seek, evaluate, give value, and compare digital information for effective learning in such informal contexts. Given the hyperconnectivity of the Internet, students' awareness of global issues might be raised through seeking information and interacting with other peers on the Internet. However, to our knowledge, no studies have been conducted to study the association between students' digital literacy and knowledge cultivation of global issues.

Curiosity is also a significant factor contributing to the knowledge-cultivation process of students. It is a fundamental element of cognition that was studied by famous authors like Pavlov (2010), James (2007), and Skinner (2019), but has only been extensively studied by psychologists and neurologists in recent years. Contemporary scientists view curiosity as a special form of internally motivated information-seeking (Kidd & Hayden, 2015; Loewenstein, 1994; Oudeyer & Kaplan, 2007). As curiosity is an intrinsically driven information-seeking phenomenon, it is a strong learning motivator. Empirically, it is associated with better learning outcomes, especially in pedagogical settings (Chang, Tseng, Liang, & Yan, 2013; Gruber, Gelman, & Ranganath, 2014; Gurning & Siregar, 2017; Kang, et al., 2009; Lee, Hsu, & Cheng, 2022; Pluck & Johnson, 2011). Specifically, in a study with 920 secondary school students and 1090 high school students, Wu, Kuo, Wu, Jen, and Hsu (2018) discovered that students' inquiry-related curiosity directly and indirectly (through inquiry-related laboratory engagement) affects their inquiry ability.

In the digital age, it is plausible to expect children and adolescents with higher curiosity to be more likely to be aware of global issues around them with the support of the Internet. By studying the happiness and curiosity of 3475 secondary school and high school students, Zhao et al. found that students with higher curiosity in using the Internet were more likely to have exploratory behaviors when using the Internet (Zhao, et al., 2011). Moreover, it was also discovered that students' Internet self-efficacy was positively associated with their curiosity. As the person's capability determines self-efficacy, digital literacy might also predict Internet self-efficacy (Zhao, et al., 2011). Nevertheless, to our knowledge, no studies have been performed to study the association between digital literacy and curiosity and the mediation of curiosity between digital literacy and global issue awareness.

Based on these gaps, the current study has the following research questions:

1. Examine whether children's and adolescents' digital literacy is positively associated with their curiosity
2. Examine whether children's and youth's digital literacy is positively associated with their knowledge cultivation of global issues
3. Examine whether the association between digital literacy and knowledge cultivation of global issues is mediated by curiosity

By exploring the associations between digital literacy, curiosity, and knowledge cultivation of global issues, we would like to argue that the digital explorative space is essential for digital natives' education for survival.

As digital literacy (e.g., abilities to process digital information) and curiosity (i.e., information-seeking tendency) are particular parts of a mind's information-processing process, the Mindsponge Theory was employed to provide the theoretical foundation for the

hypotheses. More details of the Mindsponge Theory are displayed in the next section. Bayesian Mindsponge Framework (BMF) analytics validated the proposed hypotheses. BMF analytics is an analytical framework that capitalizes on the compatibility between the Mindsponge Theory and the Bayesian inference for statistical analysis. The analysis was performed on a dataset of 2379 students in 59 elementary, secondary, and high schools across six provinces and cities in Vietnam.

2. Methodology

2.1. Theoretical foundation and hypotheses

Mindsponge Theory was employed to provide theoretical support for the hypotheses in the current study (Vuong, 2023). It is a novel theory of information processing in the human mind that was developed based on evidence from ecological and physiological systems to cellular and molecular systems. The term "mindsponge" is a metaphor that refers mind as a sponge that can expel not useful or relevant information and absorb appropriate information that fits or complements the context (Vuong & Napier, 2015). Through the lens of Mindsponge Theory, a mind can be deemed as an information collection-cum-processor that has goal(s) and priority, depending on the demand of the system. The system's fundamental purpose is to prolong its existence in one way or another, including survival, growth, and reproduction. To achieve its goal and keep its priority, the mind involves a subjective cost-benefit evaluation that aims to maximize the perceived benefits and minimize the perceived costs of the system (Vuong, Le, et al., 2023; Vuong, Nguyen, & Le, 2021b). In other words, the mind is not a passive recipient of information but an active processor of information that is able to select and absorb information from the surrounding environment, filter inappropriate information, and generate responses to solve problems and adapt to the environment (Vuong, Nguyen, & La, 2022).

The mind's output generation, input acquisition, and filtering processes are greatly influenced by the mindset. The theory defines a human's mindset as a collection of trusted values (beliefs or trusted information). Because information is regarded as the most basic entity in the information processing perspective, the term "information" can be used interchangeably for "idea" and "value" (Davies & Gregersen, 2014; Dyson, 1999). For the sake of distinction, "idea" and "value" can be seen as the mind's subjective interpretations of the information that contains them. Fundamentally, a mindset exists because of the capability to store information – or memory, of the mind (or the brain). As the mind is not an isolated system from the surrounding environment, it constantly interacts with the environment. Information absorbed from the environment and integrated into the mindset is stored as trusted values. Therefore, the mindset's content changes to better fit mental representations to reality on a continuous timeline.

From the mindsponge approach, knowledge and ability are the results of mental processes that occur inside the mind. In particular, knowledge is considered information stored within

the mind, while the ability can be deemed the mind's capability of capitalizing on information existing within the mind for subsequent thinking processes or behaviors (M.-H. Nguyen, Khuc, et al., 2022). Curiosity is important in adaptive behavior, promoting information-seeking and interpretation attitudes (Harrison, Sluss, & Ashforth, 2011). Curiosity is suggested to induce information-seeking behavior through the functional connectivity within the mesolimbic dopaminergic circuit (Eschmann, Pereira, Valji, Dehmelt, & Gruber, 2023). Regarding reward-based neural mechanisms, curiosity influences how a biological system searches for information in the environment for motivating, developing, and regulating learning (Cervera, Wang, & Hayden, 2020). For example, regarding the oculomotor system, exploration driven by curiosity involves multiple mechanisms, including automatic biases toward novelty as well as systematic searches for new information (Gottlieb, Oudeyer, Lopes, & Baranes, 2013). Behavioral decisions favoring advance information over primary reward due to curiosity are suggested to be processed by neurons in the orbitofrontal cortex (Blanchard, Hayden, & Bromberg-Martin, 2015). A study on the process of curiosity-driven learning conducted in robots shows similarities to human infant development, suggesting the critical role of curiosity in individual development and evolution (Oudeyer & Smith, 2016).

As a result, following the information-processing approach, digital literacy can be defined as knowledge and the ability to understand and utilize information from digital sources. To make the concept of digital literacy less equivocal, Bawden (Bawden, 2001, 2008) suggests people with high literacy should have the following competencies:

- Internet searching
- Publishing and communicating
- Content evaluation
- Knowledge assembly (ability to collect reliable information from diverse sources)

These four competencies are analogous to information-seeking, information-exchanging, and information-selection capabilities through the information-processing lens. Notably, information-selection capability covers both the ability to evaluate the content and collect reliable information from diverse sources.

The mind is an information processor that has its goals/priorities/desires and is bounded by many constraints, like physical and mental constraints (e.g., neural capacity, information receptors, energy, etc.). Besides trying to accomplish the goals, the mind also has to keep the goals/priorities/desires within the perceived capacity limits of the mind and body. Otherwise, it can lead to adverse consequences when the limits are passed. For example, students with little or no digital literacy might feel stressed and anxious when conducting a task on a computer. Curiosity is generally defined as "a cognitive induced deprivation that arises from the perception of a gap in knowledge and understanding" (Kidd & Hayden,

2015). Given that such cognition is also an outcome of the mind's information-processing process, it is dependent on other perceptions of the mind about the mind's capacity to conduct information exploration. Therefore, we proposed the following Hypotheses:

H1: Students with a higher capability to seek information on the Internet are more interested in exploration

H2: Students with a higher capability to select appropriate information on the Internet are more interested in exploration

H3: Students with a higher capability to exchange information with foreigners using a foreign language are more interested in exploration

Based on these three digital capabilities, students might be able to operate and learn new information on the Internet, increasing their chance to access and absorb information related to global issues, like climate change, inequality, overpopulation, etc. Thus, we proposed the following Hypotheses (H):

H4: Students with a higher capability to seek information on the Internet are more likely to be knowledgeable of global issues

H5: Students with a higher capability to select appropriate information on the Internet are more likely to be knowledgeable of global issues

H6: Students with a higher capability to exchange information with foreigners using a foreign language are more likely to be knowledgeable of global issues

If Hypotheses 1-6 are validated, curiosity tends to mediate the relationship between digital literacy and global issues awareness. Thus, we checked the mediation effect of curiosity through the following Hypothesis:

H7: Students with more interested in exploration are more likely to be knowledgeable of global issues

2.2. Model construction

2.2.1. Variable selection and rationale

In this study, we employed secondary data obtained from a dataset of Nguyen et al (H.-L. Nguyen, Dinh, Hoang, Luong, & Le, 2021) to examine how the Internet information-seeking, -selecting, and -exchanging capabilities of Vietnamese children affect their curiosity and the curiosity's effect on their awareness of global issues. The dataset aimed to assess the Vietnamese school students' awareness, skills, and attitudes on a large scale regarding global citizenship. Under the globalization process, the "Studying on Vietnam Global Citizenship" project was conducted from 2017 to 2020 to evaluate the status of global citizenship with the need for comprehensive education reform in Vietnam. In charge of this initiative was the

Vietnam National Institute of Educational Sciences. The study procedure and plan received approval and followed all rules and regulations set forth by the entity in charge.

The questionnaire was developed using the primary learning outcomes, scales, and ideals for global citizens from UNESCO (Bangkok, 2015) and then customized to the educational context in Vietnam by experts and consultants. Most of the questionnaire's questions are related to the idea of global citizenship, which comprises the cognitive, socio-emotional, and behavioral domains, as well as Oxfam's global citizenship curriculum (Programme, 2006). Before being used nationwide, the questionnaire was prepared by educational specialists and piloted in one school. At the Experimental School of Education Science in Hanoi, Vietnam, the questionnaire was piloted with a participating group of 40 upper-secondary students, 45 lower-secondary students, and 39 primary school students. After the piloting, questions and language were modified, and the field experts once again reviewed the questionnaire.

The cluster sampling approach was used to choose the survey's participants on a broad scale. There were 54 schools from 6 provinces and cities (Hanoi, Nam Dinh, Quang Binh, Gia Lai, Ho Chi Minh City, and Can Tho) in three main areas (the North, Middle, and South of Vietnam) which were included in the sampling list. In each province, nine schools were chosen in 3 districts, with one primary, one lower secondary, and one upper secondary school being sampled in each district. The survey list includes schools from both urban and rural regions of Vietnam.

The plans, objectives, contents, methodologies, and survey participants were discussed with local education managers and school administrators before this activity. Parents and students listed as participants in the survey were provided information about it by school administrators. All participants and guardians confirmed volunteering and signed consent forms before the survey's administration.

There were 2379 students who participated in the study, including 814 students in primary school, 776 in lower secondary school, and 789 in upper secondary school. Due to problems of missing data, 310 responses were eliminated. After the data cleaning process, 2069 valid responses were included in the final data set. The dataset is available at: https://www.sciencedirect.com/science/article/pii/S2352340921004467#bib0002

Table 1 presents the variables, and they are described in four criteria: variable name, explanation, coded variable(s) in the dataset, and converted value.

Table 1. Data descriptions

Variable name	Explanation	Coded variable(s) in the dataset	Converted value
Curiosity	Vietnamese children's and	*Q2i_1*	1: disagree, 2: partly agree,

	youth's discovery mindsets		3: agree, 4: completely agree
InternetInforSeeking	Internet information-seeking capability	*Q2iii_9*	1: disagree, 2: partly agree, 3: agree, 4: completely agree
InternetInforSelection	Internet information-selecting capability	*Q2iii_10*	1: disagree, 2: partly agree, 3: agree, 4: completely agree
InternetForeignInforExchange	Internet information-exchanging capability	*Q2iii_11*	1: disagree, 2: partly agree, 3: agree, 4: completely agree
GlobalIssueAwareness	The awareness of students toward global issues	*Q1_1, Q1_2, Q1_3, Q1_4, Q1_5, Q1_6, Q1_7, Q1_8, Q1_9, Q1_10, Q1_11, Q1_12*	1: I have not heard about this issue, 2: I have heard about this issue but cannot explain, 3: I know this issue and can explain a little bit about this, 4: I know this issue and can explain well about this

In the current study, the variable *Curiosity* was employed to represent the trait curiosity of the children and adolescents. Trait curiosity reflects the general, unitary trait associated with a person's motivation to explore and learn (Kashdan, et al., 2018; Peterson, 2020). To measure the trait of curiosity, the respondents were asked to what extent they agreed with the following statement: 'I like to explore by myself.' The respondents were given four options: 'disagree,' 'partially agree,' 'agree,' and 'completely agree.'

The digital literacy of children and adolescents was represented by three variables reflecting three digital competencies elaborated in the Theoretical foundation section: *InternetInforSeeking*, *InternetInforSelection*, and *InternetForeignInforExchange*. Specifically, these variables were generated from respondents' agreement to the following three statements, respectively: 'I can find information to study on the Internet with support tools such as Google, Yahoo, etc.,' 'I can determine which information on the Internet is appropriate for me,' and 'I can discuss it with foreigners in foreign languages.' The respondents were given four options: 'disagree,' 'partially agree,' 'agree,' and 'completely agree.'

To measure the respondents' awareness of global issues, we generated a composite variable *GlobalIssueAwareness* by averaging the value of *Q1_1* to *Q1_12* variables. The internal reliability of these twelve variables is high, with a Cronbach alpha of 0.83. Variables *Q1_1* to *Q1_12* reflect the respondents' awareness and knowledge regarding twelve remarkable global issues:

1. Issues of environmental pollution
2. Climate change
3. The risk of depletion and the rational use of resources (energy, clean water, etc.)
4. Disease problems
5. The rapid population growth in some places and the risk of population aging in some parts of the world
6. The cause of poverty
7. Unemployment issues in the world
8. The development and influence of the internet
9. Gender equality in different parts of the world
10. Peace protection in the world
11. The coherent, interactive, and interdependent relationships of communities (such as between one country and another, between local, national, and global levels) (e.g., environment protection or pollution action at a local, in a country, can affect the environment in another region or country, etc.))

12. Cultural diversity

The respondents were provided with four options to choose from: 'I have never heard of this,' 'I've heard about this, but I would not be able to explain what it is,' 'I know and could explain a little about this.,' and 'I know this well, and I would be able to explain this well.'

2.2.2. Statistical models

For testing Hypotheses 1-3, we constructed Model 1 as follows:

$$Curiosity \sim normal(\mu, \sigma) \quad (1.1)$$

$$\mu_i = \beta_0 + \beta_{InternetInforSeeking} * InternetInforSeeking_i + \beta_{InternetInforSelection} * InternetInforSelection_i + \beta_{InternetForeignInforExchange} * InternetForeignInforExchange_i \quad (1.2)$$

$$\beta \sim normal(M, S) \quad (1.3)$$

The logical network of Model 1 is displayed in Figure 1.

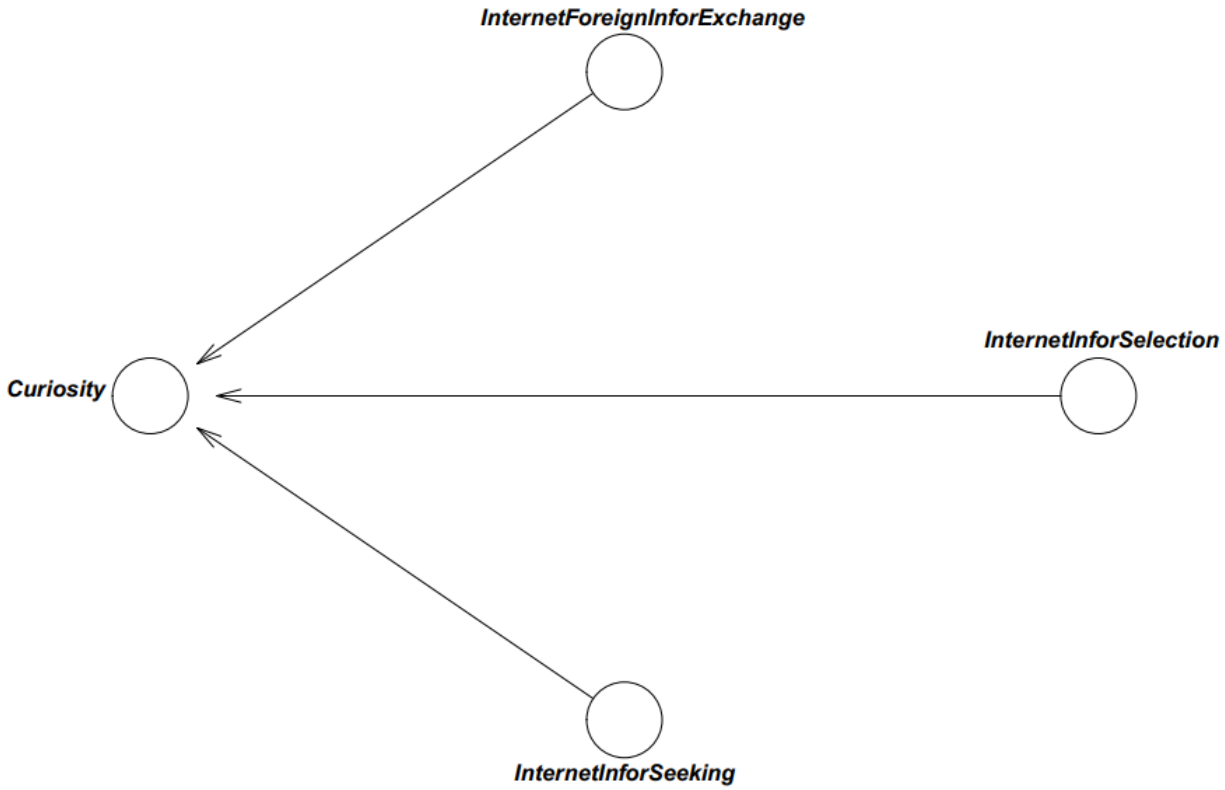

Figure 1. Logical network of Model 1

The probability around μ is determined by the form of the normal distribution, whose width is specified by the standard deviation σ. μ_i indicates the level of curiosity of student i; $InternetInforSeeking_i$ indicates student i's Internet information-seeking capability; $InternetInforSelection_i$ indicates student i's Internet information-selecting capability; $InternetForeignInforExchange_i$ indicates student i's information-exchanging capability using a foreign language. Model 1 has seven parameters: the coefficients, $\beta_{InternetInforSeeking}$, $\beta_{InternetInforSelection}$, and $\beta_{InternetForeignInforExchange}$, the intercept, β_0, and the standard deviation of the "noise", σ. The coefficients of the predictor variables are distributed as a normal distribution around the mean denoted M and with the standard deviation denoted S.

To test the mediation effect of curiosity on the relationship between digital literacy and global issues awareness, it is necessary first to test the association between curiosity and global issues awareness. Thus, Model 2 was constructed.

$$GlobalIssueAwareness \sim normal(\mu, \sigma) \tag{2.1}$$

$$\mu_i = \beta_0 + \beta_{Curiosity} * Curiosity_i \tag{2.2}$$

$$\beta \sim normal(M, S) \tag{2.3}$$

$GlobalIssueAwareness_{\ i}$ indicates student i's global issues awareness; $Curiosity_i$ indicates student i's level of curiosity. Model 2 has three parameters: the coefficient, $\beta_{Curiosity}$, the intercept, β_0, and the standard deviation of the "noise", σ. The logical model of Model 2 is shown in Figure 2.

Figure 2. Logical network of Model 2

For testing Hypotheses 4-7, we constructed Model 3 to examine the relationship between digital literacy and global issues awareness. The robustness of *Curiosity*'s effect on global issues awareness was also checked (when adding other variables) using Model 3.

$$GlobalIssueAwareness \sim normal(\mu, \sigma) \quad (3.1)$$

$$\mu_i = \beta_0 + \beta_{Curiosity} * Curiosity_i + \beta_{InternetInforSeeking} * InternetInforSeeking_i + \beta_{InternetInforSelection} * InternetInforSelection_i + \beta_{InternetForeignInforExchange} * InternetForeignInforExchange_i \quad (3.2)$$

$$\beta \sim normal(M, S) \quad (3.3)$$

Figure 3 demonstrates the logical network of Model 3.

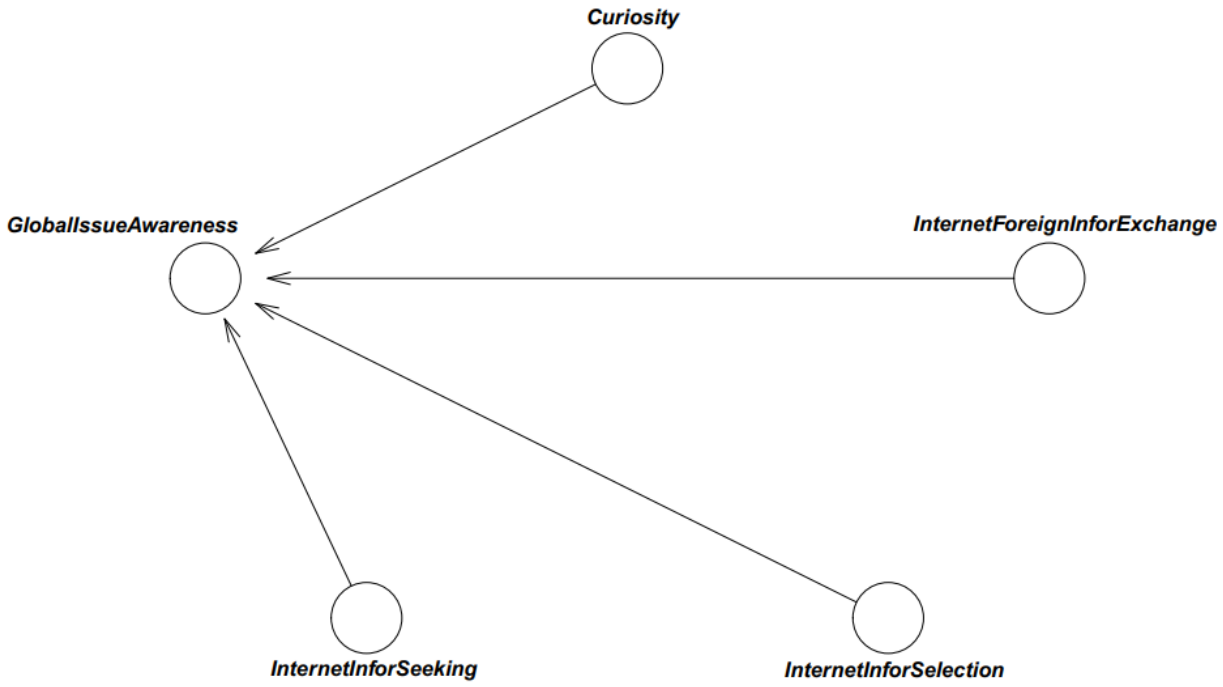

Figure 3. Logical network of Model 3

2.2.3. Analysis and validation

The constructed models were then analyzed using the Hamiltonian Monte Carlo algorithm for simulations with Bayesian inference for posterior measurement. There are some motives to employ the Bayesian inference in this study. Firstly, it is strongly consistent with the mindsponge mechanism (M.-H. Nguyen, La, Le, & Vuong, 2022a, 2022b). Secondly, The parsimony principle, also known as Occam's razor, is maintained when Bayesian analysis is used to construct parsimonious models. The inference treats all properties probabilistically (Csilléry, Blum, Gaggiotti, & François, 2010; Gill, 2014), enabling researchers to avoid including control variables and concentrate on the theoretically chosen variables (Bhatti & Kim, 2021).

The bayesvl R package was employed to conduct the Bayesian analysis (La, et al., 2022; Vuong, et al., 2022). Markov chains were set as four, each containing 2000 iterations for the warm-up phase and 5000 iterations for simulations. Since this is an exploratory study, the models were measured using uninformative priors defined as a flat prior distribution to avoid subjective bias.

The Pareto smoothed importance-sampling leave-one-out cross-validation (PSIS-LOO) method was used to verify how well the models fit the available data (Vehtari & Gabry, 2019; Vehtari, Gelman, & Gabry, 2017). The following formula is used to calculate LOO:

$$LOO = -2LPPD_{loo} = -2\sum_{i=1}^{n} \log \int p(y_i|\theta) p_{post(-i)}(\theta) d\theta \quad (4)$$

The posterior distribution based on the data minus data point i is called $p_{post(-i)}(\theta)$. When using the PSIS method provided by the *loo* package in R, *k*-Pareto values are computed to create leave-one-out cross-validation, which aids in determining the observations that have a poor effect on the PSIS estimate. If the k values are less than 0.5, the model's goodness-of-fit is acceptable.

If the model and the data are well-matched, we will continue to validate if the simulation process maintained the Markov property or the convergence of the Markov chains. Two diagnostic statistics for the convergence of the Markov chains are the effective sample size (*n_eff*) and the Gelman-Rubin shrink factor (*Rhat*). If the *n_eff* values are greater than 1000, the effective samples are considered sufficient for reliable inference. Besides, the chains may not converge when the *Rhat* values are higher than 1.1. The trace, Gelman-Rubin-Brooks, and autocorrelation plots can all also be used to diagnose the convergence visually.

The Open Science Framework stored all the code and data used for this study's analysis, allowing for public review and evaluation for transparency and cost-effectiveness (Vuong, 2018): https://osf.io/5w3js/.

3. Results

3.1. The relationship between digital literacy and curiosity

The PSIS-LOO diagnosis was initially used to assess how well the models fit the data. As can be seen from Figure 4, all Pareto *k* values are below the threshold of 0.5, indicating the acceptable goodness-of-fit of Model 1 with the data.

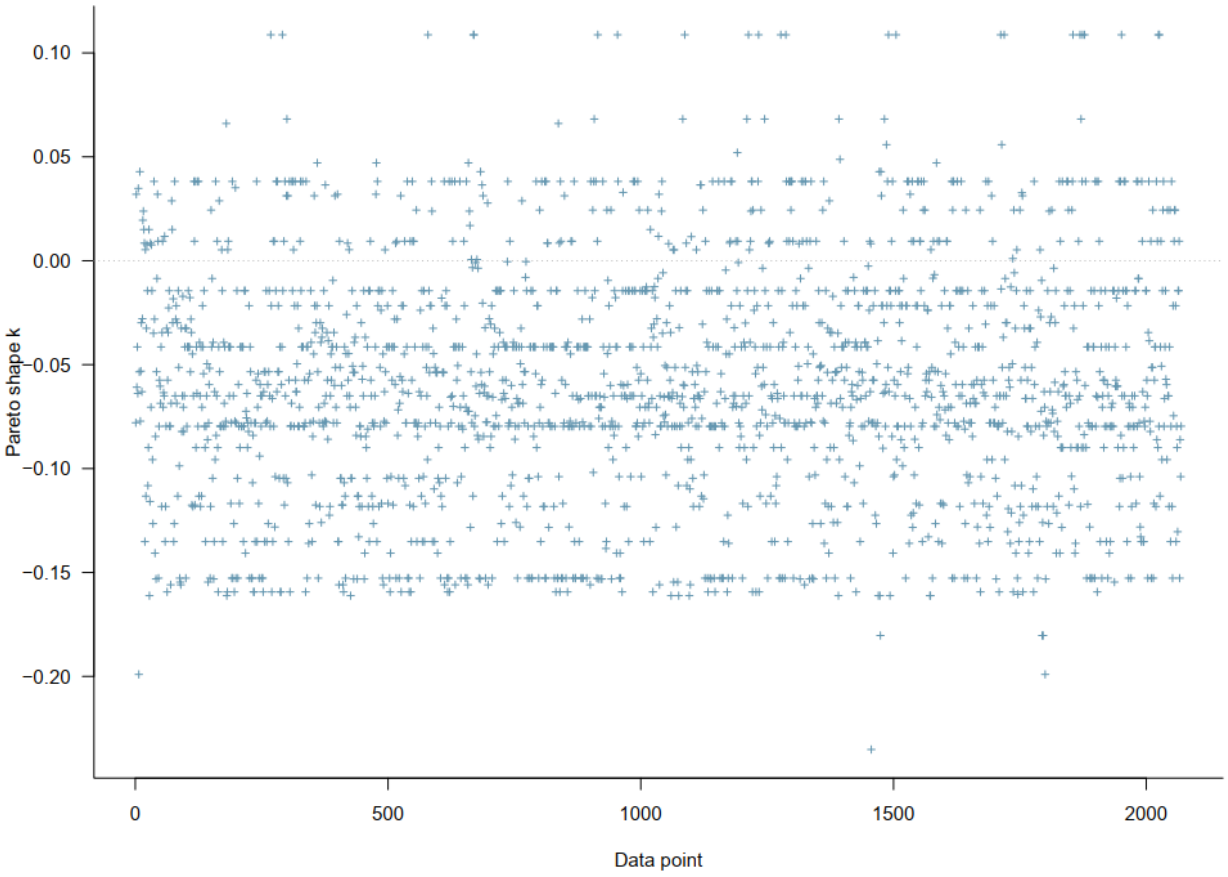

Figure 4. Model 1's PSIS diagnostic plot

Then, the convergence of Model 1's Markov chains was verified using the convergence diagnostic statistics (i.e., *n_eff* and *Rhat*) and plots (i.e., trace plots, Gelman-Rubin-Brooks plots, and autocorrelation plots). Statistically, all the coefficients' *n_eff* values are larger than 1000, and *Rhat* values are equal to 1 (see Table 2). These results indicate that Model 1's Markov chains are convergent. Visually, a stable variation of the Markov chains of Model 1 around a central equilibrium, depicted in Figure 5, indicates a sign of convergence. Besides, as shrink factors approach one before the warm-up period ends, the Gelman-Rubin-Brooks plots support the convergence of the chains (see Figure 6).

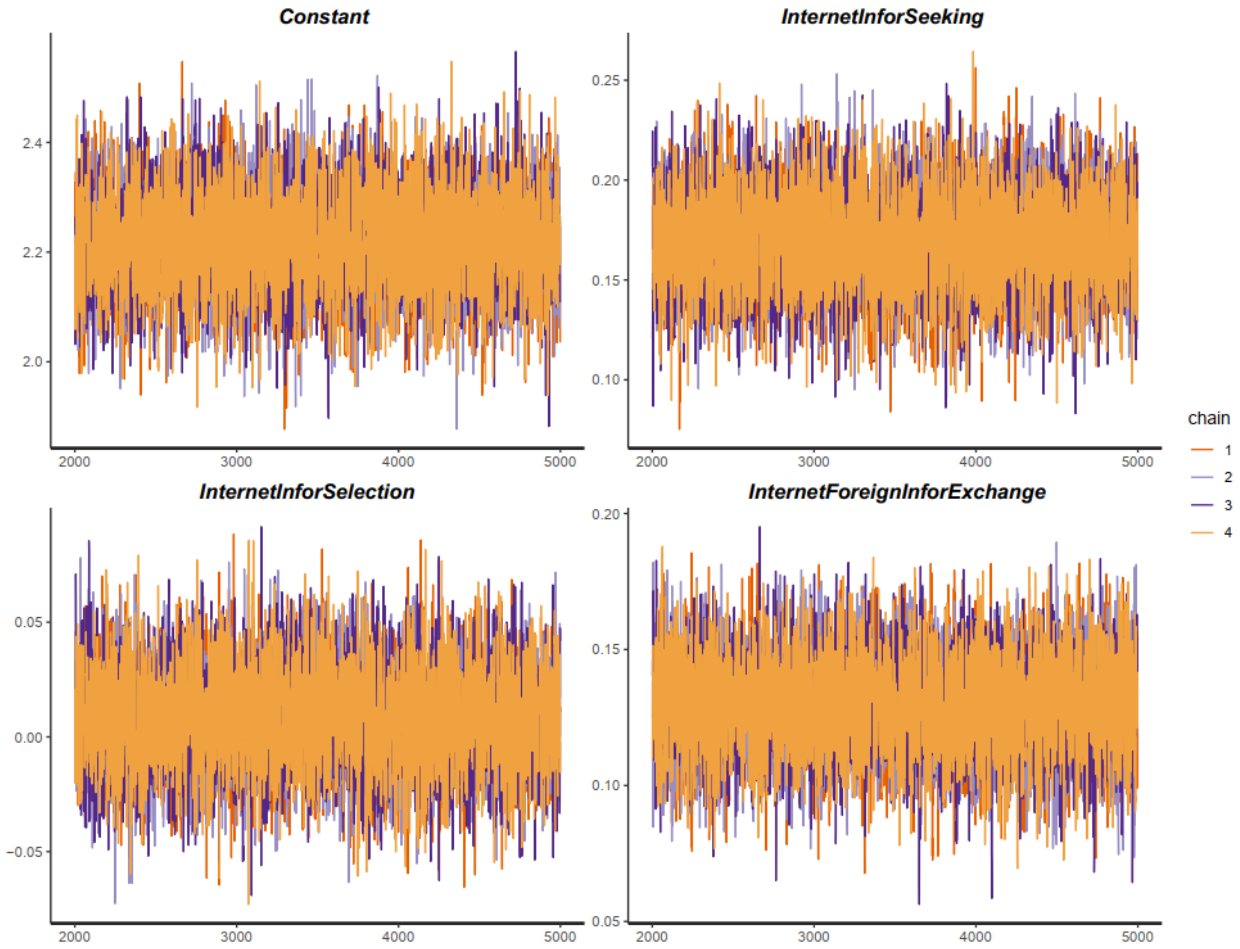

Figure 5. Model 1's trace plots

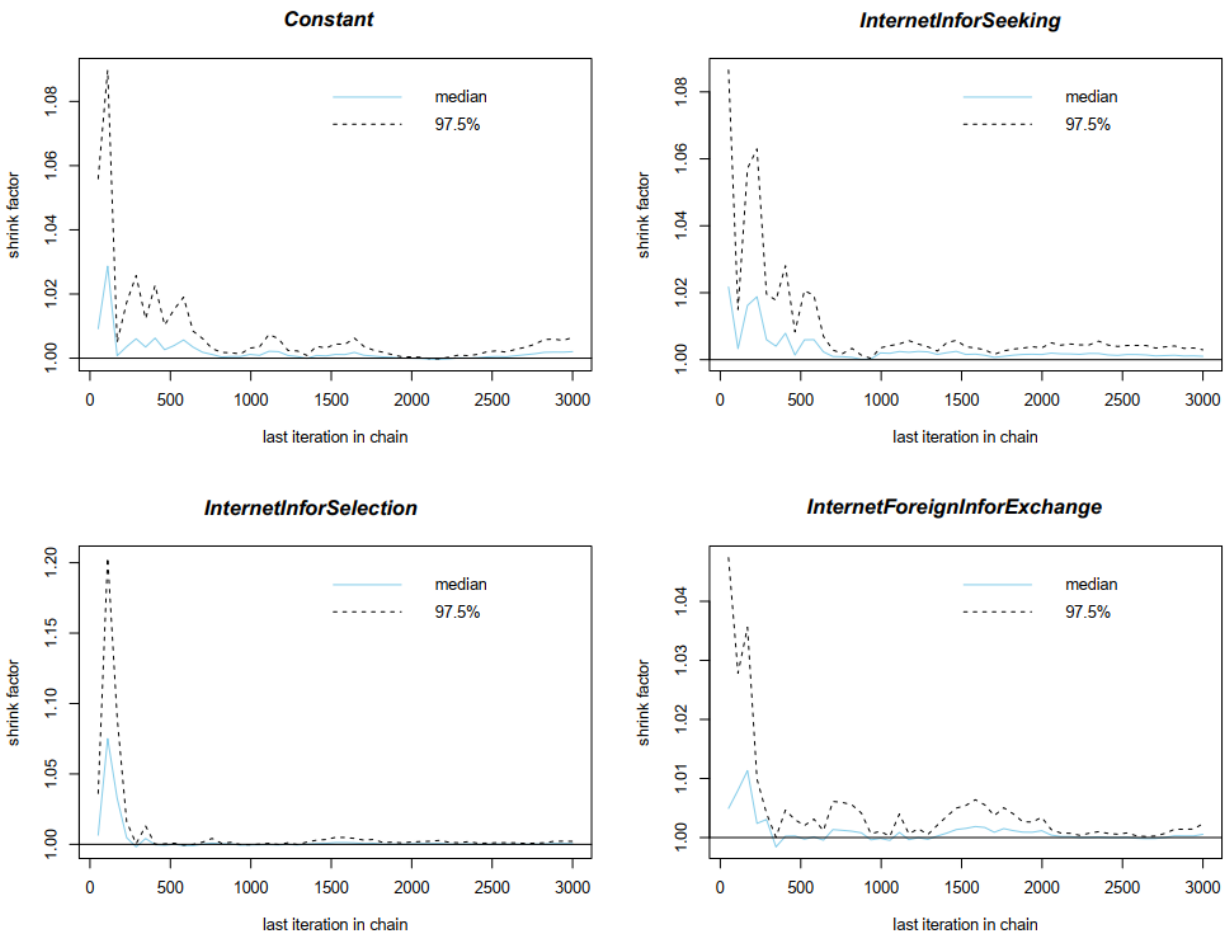

Figure 6. Model 1's Gelman-Rubin-Brooks plots

The autocorrelation plots in Figure 7 further demonstrate the Markov chain convergence. Specifically, after a number of lags, the autocorrelation levels (*y*-axis) decrease to zero, suggesting that iterative samples used in the stochastic simulation process are memoryless.

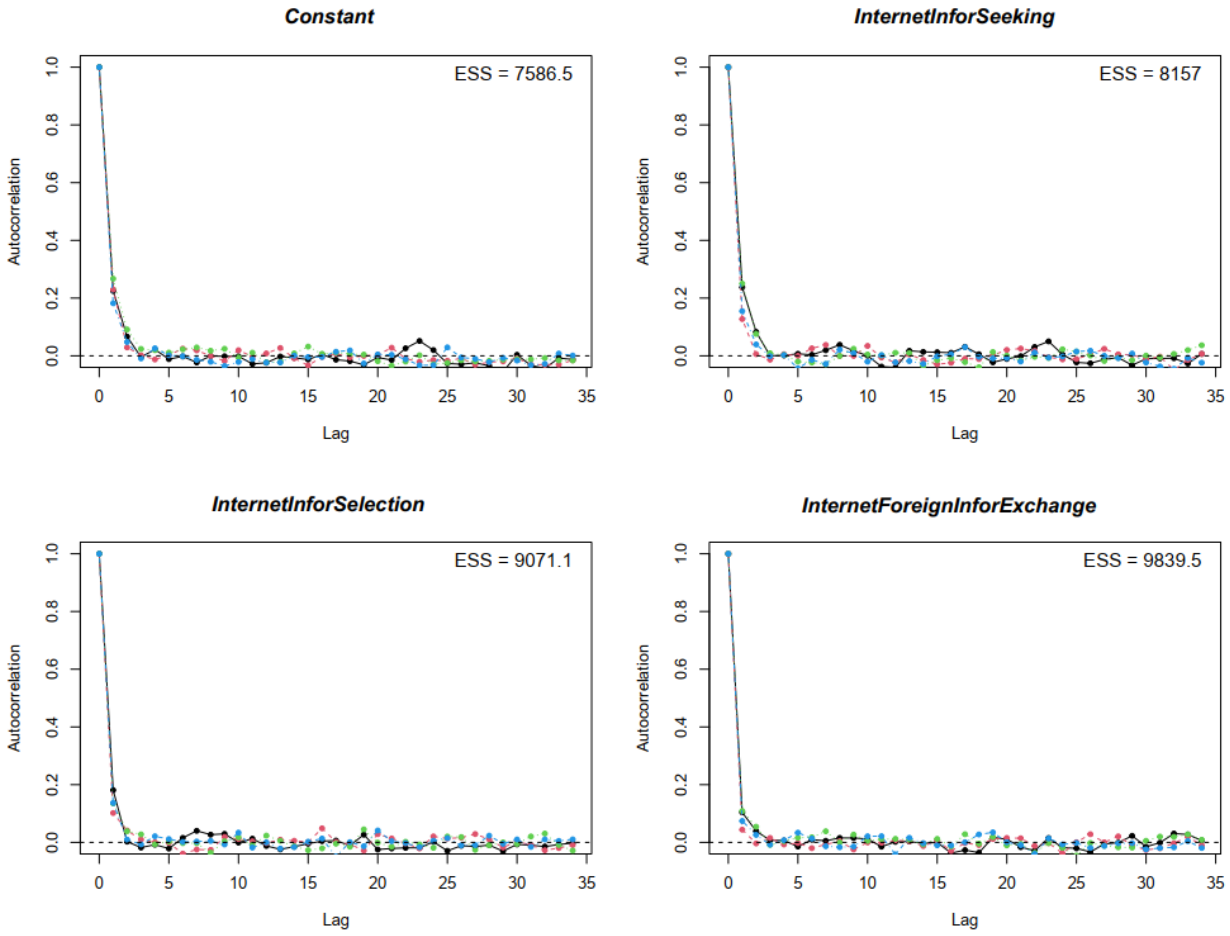

Figure 7. Model 1's autocorrelation plots

Table 2. Model 1's estimated results

Model 1				
Parameters	**Mean**	**SD**	***n_eff***	***Rhat***
Constant	2.22	0.09	7651	1
InternetInforSeeking	0.17	0.02	7797	1
InternetInforSelection	0.01	0.02	9101	1
InternetForeignInforExchange	0.13	0.02	9579	1

The posterior distributions of the coefficients of Model 1 are shown in Table 2. According to the estimated results, *InternetInforSeeking* and *InternetForeignInforExchange* have positive

impacts on *Curiosity* ($\mu_{Model\ 1\_InternetInforSeeking} = 0.17$ and $\sigma_{Model\ 1\_InternetInforSeeking} = 0.02$; $\mu_{Model\ 1\_InternetForeignInforExchange} = 0.13$ and $\sigma_{Model\ 1\_InternetForeignInforExchange} = 0.02$), while *InternetInforSelection* has no impact ($\mu_{Model\ 1\_InternetInforSelection} = 0.01$ and $\sigma_{Model\ 1\_InternetInforSelection} = 0.02$). The posterior distributions are also illustrated in the interval plots shown in Figure 8. The dot represents the mean value, which is regarded as the value of the coefficient that has the highest probability of occurring, and the thick blue lines show the credible range within the 89% Highest Posterior Density Intervals (HPDI). All the 89% HPDIs of *InternetInforSeeking* and *InternetForeignInforExchange* are located on the positive side of the *x*-axis, implying that the positive impacts of *InternetInforSeeking* and *InternetForeignInforExchange* on *Curiosity* are reliable. As a result, Hypotheses 1 and 3 are validated, whereas Hypothesis 2 is rejected.

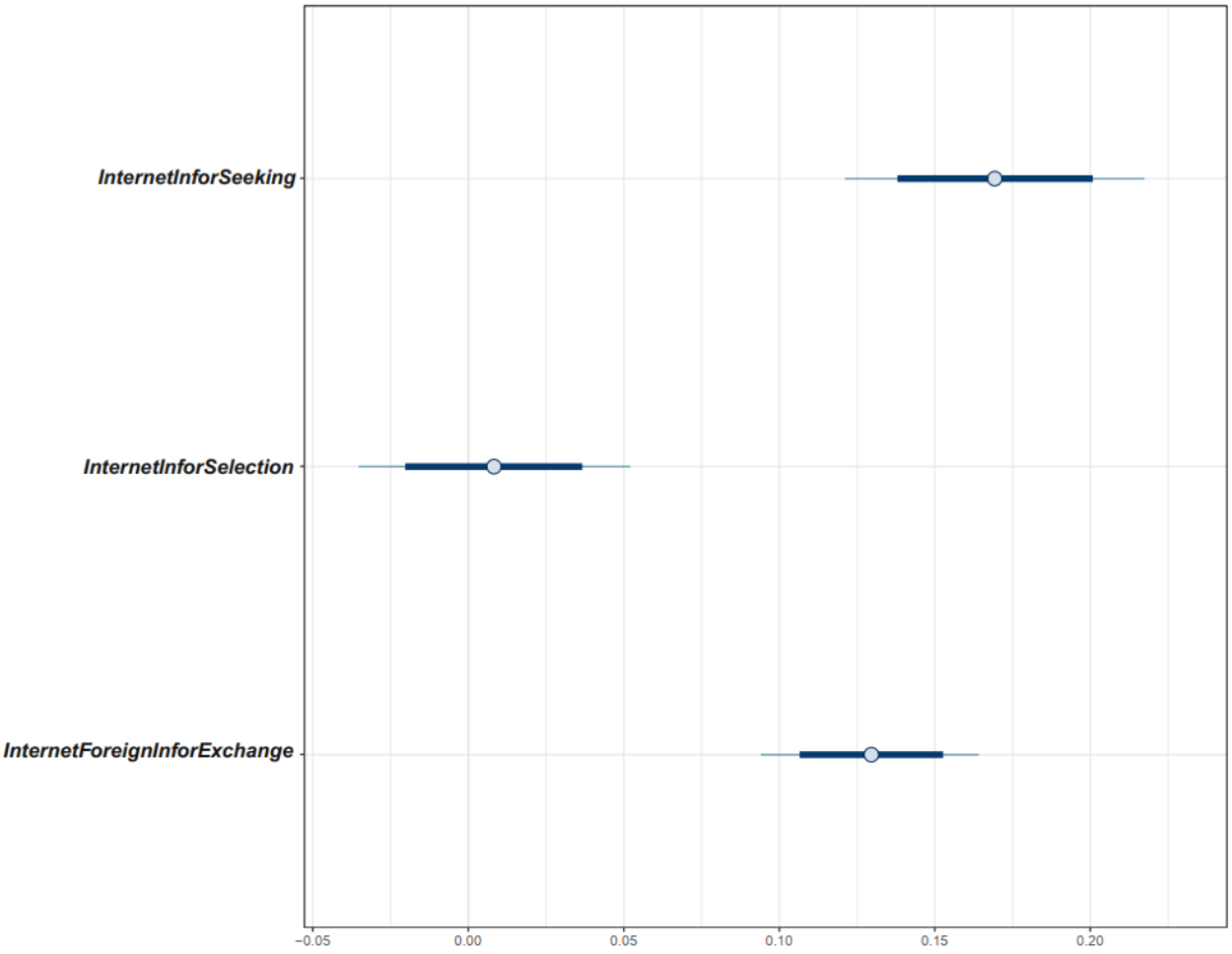

Figure 8. The posterior distributions of Model 1's coefficients

3.2. The relationship between curiosity and global issues awareness

Similar to Model 1, the PSIS and convergence diagnoses were also assessed to determine whether Model 2's estimated results could be used for interpretation. The PSIS diagnostic

plot of Model 2 shows that all *k*-values are below 0.5 (see Figure A1), so Model 2 is deemed well-specified, while the trace plots, Gelman-Rubin-Brooks plots, and autocorrelation plots suggest that Model 2's Markov chains are convergent (see Figures A2-A4). Thus, the estimated results can be used for interpretation.

Table 3. Model 2's estimated results

Model 2				
Parameters	**Mean**	**SD**	***n_eff***	***Rhat***
Constant	2.55	0.04	4321	1
Curiosity	0.11	0.01	5643	1

Based on the estimated results displayed in Table 3, we can see that *Curiosity* has a positive impact on *GlobalIssueAwareness* ($\mu_{Model\ 2\_Curiosity} = 0.11$ and $\sigma_{Model\ 2\_Curiosity} = 0.01$). The posterior distribution of *Curiosity* displayed in Figure 9 is located entirely on the positive side of the *x*-axis (red line), implying that the impact is reliable.

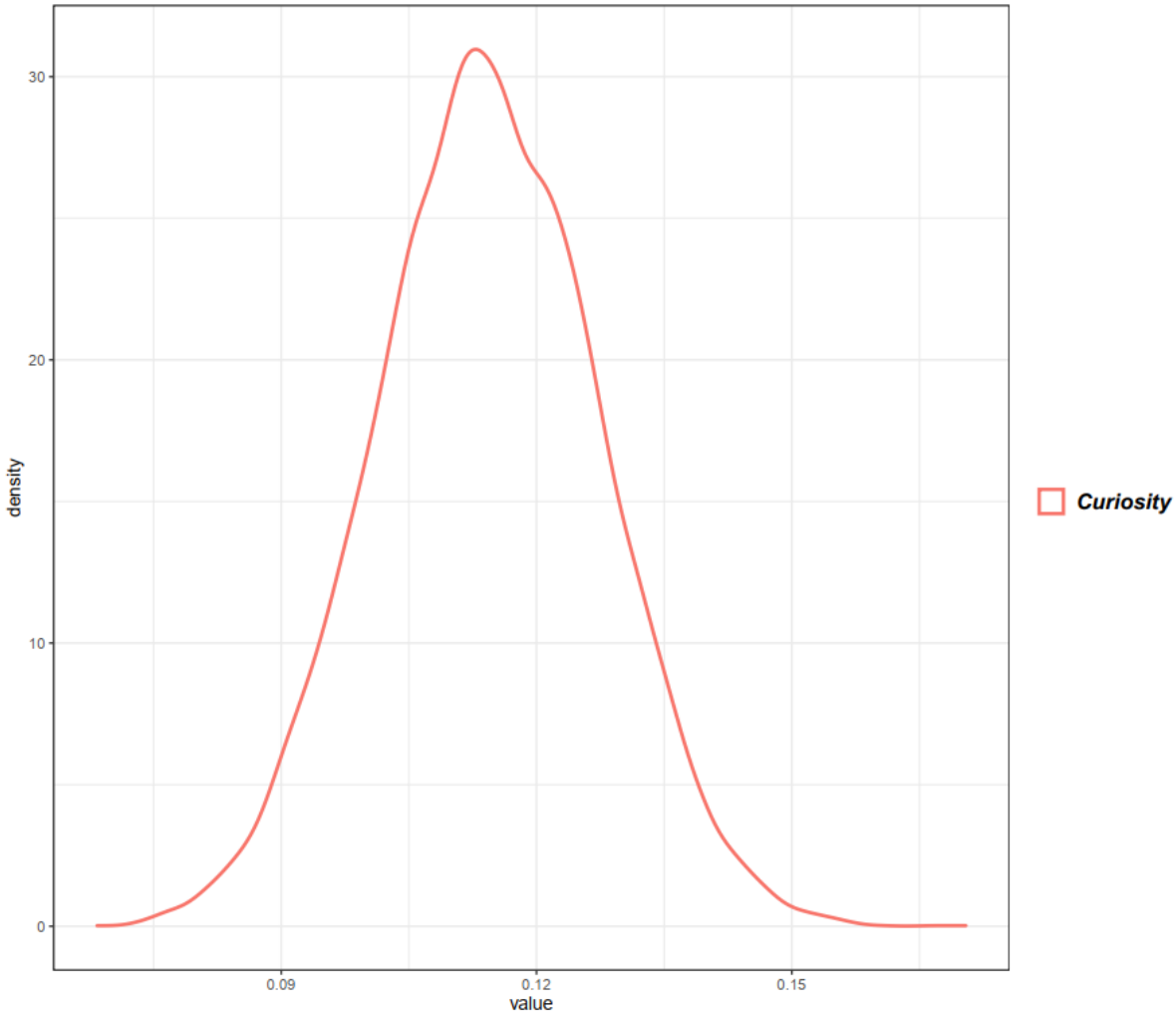

Figure 9. The posterior distribution of Model 2's coefficient

3.3. The relationship between digital literacy, curiosity, and global issues awareness

The PSIS and convergence diagnoses of Model 3 also validate the goodness-of-fit and the convergence of the model, so the estimated results are qualified for interpretation (see Figures A5-A8). The estimated results in Table 4 indicate that *InternetInforSeeking* ($\mu_{Model\ 3\_InternetInforSeeking} = 0.07$ and $\sigma_{Model\ 3\_InternetInforSeeking} = 0.01$), *InternetInforSelection* ($\mu_{Model\ 3\_InternetInforSelection} = 0.07$ and $\sigma_{Model\ 3\_InternetInforSelection} = 0.01$), *InternetForeignInforExchange* ($\mu_{Model\ 3\_InternetForeignInforExchange} = 0.07$ and $\sigma_{Model\ 3\_InternetForeignInforExchange} = 0.01$), and *Curiosity* ($\mu_{Model\ 3\_Curiosity} = 0.07$ and $\sigma_{Model\ 3\_Curiosity} = 0.01$) all have positive impacts on *GlobalIssueAwareness*. The 90% HPDIs of all the coefficients, shown in Figure 10, are entirely located on the positive side of the *x*-axis, suggesting that the impacts are reliable.

Table 4. Model 3's estimated results

Model 3				
Parameters	**Mean**	**SD**	***n_eff***	***Rhat***
Constant	1.95	0.06	6481	1
InternetInforSeeking	0.07	0.01	7952	1
InternetInforSelection	0.08	0.01	8231	1
InternetForeignInforExchange	0.07	0.01	10523	1
Curiosity	0.07	0.01	8963	1

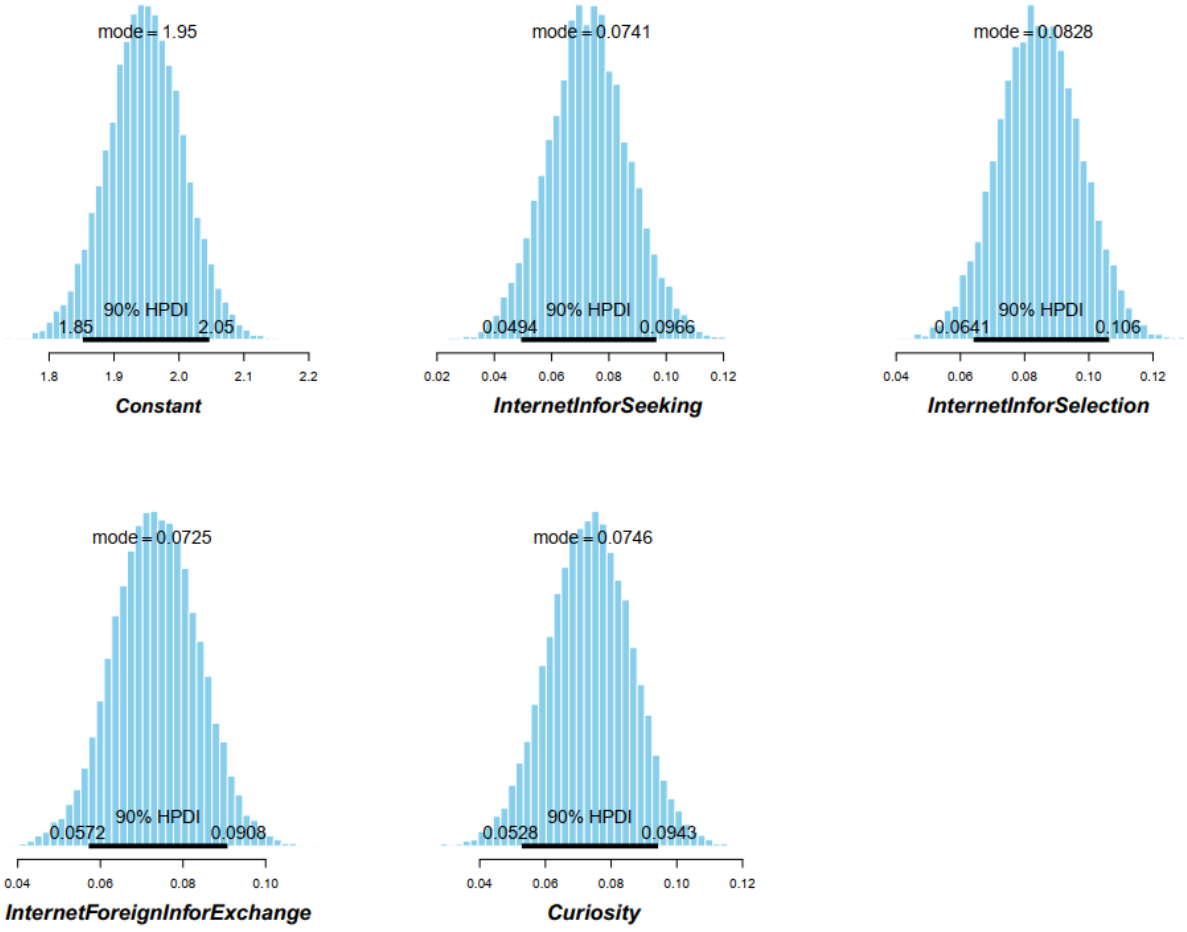

Figure 10. The posterior distributions of Model 3's coefficients

Based on the estimated results of Models 1-3, it is found that *InternetInforSeeking* and *InternetForeignInforExchange* have direct and indirect impacts on *GlobalIssueAwareness*. The indirect impacts are mediated by *Curiosity*. However, *InternetInforSelection* only has a direct positive impact on *GlobalIssueAwareness*.

4. Discussion

Employing BMF analytics on 2069 students in Vietnam, we found that children and adolescents with higher Internet information-seeking, -selecting, and -exchanging capabilities are more likely to obtain a higher level of global issues awareness. Besides the direct impacts, Internet information-seeking and -exchanging capabilities also have indirect impacts on global issues awareness through the mediation of curiosity. These results validate Hypotheses 1-7, except for Hypothesis 2. The results also support our argument that the digital environment is a valuable explorative space for the youth to self-educate and prepare themselves for dealing with existential risks.

The direct impacts of digital literacy on global issues awareness can be elaborated through the information-processing perspective of Mindsponge Theory. Students with high information-seeking capabilities have better knowledge of how to use search engines and trace information sources, allowing them to access more new information sources and obtain a wider range of knowledge than those with low or no information-seeking capabilities. Moreover, while actively seeking information, they are also exposed to a fair amount of new information passively (Liu, 2020). Since the Internet is hyperconnected, it allows users to acquire information globally. Exposure to a higher amount of Internet information increases the students' chance to come across and obtain information related to global issues, like climate change, overpopulation, inequality, etc. When viewing a human mind as an information collection-cum-processor, each person can be deemed to hold a pool of knowledge that is generated from his/her interactions with the surrounding environment (i.e., socio-cultural and educational environments). People with different native languages tend to have distinct pools of knowledge. Communicating with foreign people allows students access to pools of knowledge from other parts of the globe, which increases the chance of being exposed to a wide range of information related to global issues.

Regarding the information-selecting capability, it is analogous to the filtering capability of the system. The Mindsponge Theory suggests that a person's filtering process is influenced by his/her mindset (or a set of trusted values). In most cases, teachers and educational curriculums are two main information sources for students during 12 years of education, so students' mindsets might be primarily shaped by interactions with their teachers and those curriculums. In Vietnam K-12 education system, civics education (orienting students to contribute to society) is a mandatory subject throughout 12 years of education, from elementary school to high school. Thus, students might consider information related to societal problems important and be more likely to absorb and integrate such information,

raising knowledge of global issues. However, the explanation for the impact of information-selecting capability on global issues knowledge is still univocal, requiring more in-depth studies for better insights regarding the impacts of students' digital capabilities and behaviors on the knowledge acquisition process.

Besides the direct impact on global issues awareness enhancement, information-seeking and -exchanging capabilities also directly affect curiosity. Without information-seeking and -exchanging capabilities, students will not consider information sources from the Internet and foreign people alternatives when considering solutions to resolve a knowledge gap. As the Internet offers students solutions to seek information with relatively low costs and talking with foreigners gives students the opportunities to access pools of knowledge that have been processed (i.e., filtered information), they can significantly reduce the costs of new information acquisition. Without them, the perceived costs of new information acquisition will substantially rise. If the perceived costs of seeking new information surpass the perceived benefits, students will be less likely to carry out information-seeking actions to satisfy the desire for incomplete information (Peterson, 2020).

Based on the findings above, we substantiated that students' learning process is not only bound to traditional classroom learning and teacher-student interactions but could also be achieved via nativist self-learning and interactions with the digital environment (Chomsky, 1967; Tomasello, 2003). A digital environment holds huge and myriad types of information, including information that does not exist in the students' surrounding physical environments; thus, it can offer students opportunities to learn things that cannot be taught at schools and at home. Given that the digital environment is becoming a more essential and regular interacting space for children and adolescents, considering them active learning agents in the digital environment and equipping them with digital literacy are necessary. With better digital literacy, children and adolescents can acquire more valuable knowledge, preparing themselves better to enter the future job markets and aiding them to make informed decisions and create innovations that can be helpful to societies.

Emotion is a fundamental aspect of our species, both in terms of information processing and the unique, profound sensations that make us humans. Emotional intelligence is even more important considering the new generations are born and growing up in a rapidly changing infosphere with many unprecedented properties of the digital society unseen in the past thousands of years of civilization. Emotions can influence information-seeking in both directions, activating and expanding or deactivating and limiting (Savolainen, 2014). Digital emotional intelligence plays a crucial role in navigating the new digital infosphere, especially when there are new forms of interpersonal interactions and complex emotions being introduced, such as belonging to an online community, distorted perceived magnitudes of personal influencing, and being influenced on social media, online parasocial relationships, AI companionship, etc. For example, interacting with AI agents displaying persuasive human-like properties is a novel matter of the digital era that has never been encountered

in former generations (Vuong, La, et al., 2023). Thus, improving digital intelligence is an effective way to increase children's and adolescents' immunity toward digital risks and threats.

Furthermore, the guidance and support of parents and educators are necessary for safeguarding children and adolescents from digital threats. However, in Vietnam, the education and parenting styles are dominantly influenced by Confucianism's education philosophy, which is authoritative-driven. In other words, educators and parents impose high control over students' learning contents, methods, and directions (Lê, Nguyen Thuy, & Tian, 2023; Mestechkina, Son, & Shin, 2014). However, such parenting and educating approaches become inappropriate in digital learning contexts for several reasons. Children and adolescents are likely to acquire greater digital knowledge and skill levels than their parents (Grossbart, Hughes, Pryor, & Yost, 2002). Even if teachers' and parents' ICT knowledge and skills can be improved through training, it is still overconfident to claim that their trained knowledge and skills are more correct and effective than the self-learned knowledge and skills of the digital natives.

If the former generations do not have sufficient knowledge and skills in the digital space, it would be quite counter-productive for them to transmit (teach) such information in a one-way manner to the younger generations, who are relatively more knowledgeable in the field. Unfortunately, due to the highly rapid technological advancement in the modern age, it is becoming harder and harder for former generations to keep up with (adapt to) the new digital environment. The ones who hold the power to control and regulate the educator-student or parent-children information exchange systems may not have the compatible competence for their tasks. For example, in a recent rather hilarious situation, a university professor failed his entire class because he did not know how ChatGPT works and assumed that every student cheated (O'Neill, 2023).

Information exchange occurs through channels and nodes among social connections in the form of a network, determining the degrees of information accessibility for each individual (Haythornthwaite, 1996). These information exchange networks are multi-layered and mutual because value optimization in an information processing system (either on an individual or collective level) requires that the connections are based on interactions with feedback, not unidirectional signaling (singular input or output) (M.-H. Nguyen, Le, & Vuong, 2023). Because of this principle, the process of information reception and interpretation in students should be considered in both the direction from educators to students (or from parents to children) and *vice versa* (Vuong, Nguyen, & Le, 2021a). Thus, educators and parents should mitigate and reduce their authoritative interventions in the digital self-learning of children and adolescents. Instead, communication (e.g., promoting perspective and empowerment) and active monitoring (e.g., co-use and discussion of media use) should be used to orient and facilitate the learning process. Doing so will not only improve the

effectiveness of children's and adolescents' self-learning and help prevent and minimize their exposure to digital risks (Helfrich, Doty, Su, Yourell, & Gabrielli, 2020).

Based on our findings and discussion, there are several major implications for the educational system to help the new generations to adapt and thrive in the brave new world. Firstly and most importantly, the exploration of young generations in the digital space should not be constrained and inhibited. Rather, it needs to be oriented and facilitated. Interactions between the infosphere and the mind are crucial for children to acquire proper knowledge and develop proper skills to survive in those digital environments, which will become an inseparable part of modern society. Apart from being an unsustainable practice, restrictions will also be ineffective if the educator does not even know what the danger really is nor how it works. Although there are many risks in the digital space, Hammond (2022) found that allowing adolescents to use the Internet is a better alternative to safeguard them rather than restricting their usage. Sonck and de Haan (2013) also support this finding by discovering that young people who spend less time on the Internet are less likely to experience risks online. Still, they are more vulnerable when being exposed to digital content.

Secondly, accessibility to digital information requires sufficient corresponding physical platforms. Schools and families should consider providing and improving the facilities or devices (e.g., powerful computers, good Internet connection, audiovisual equipment, etc.) children need. Thirdly, autonomy and horizontal information exchange should be strengthened. Besides promoting guided self-learning, peer learning can be an effective tool in classrooms or public events, where children can share their self-developed digital knowledge and skills with each other. Fourthly, a good educational culture based on genuine care, respect, and flexibility can greatly benefit communication. Teachers and parents should develop a good emotional intelligence level and study together with children, which will foster mutual trust – a prioritized interpersonal information channel. Fifthly, in the long term, the former generations should explore the new digital space to become competent and able to relate easily to the children's problems. After all, it is never too late for a person to learn and enjoy new things.

The research has a few limitations (Vuong, 2020). First, since the dataset only includes Vietnamese samples, generalizing the findings to other countries should be done with caution. Future research is recommended to confirm Mindsponge Theory's information-processing reasoning approach in various nations and circumstances with diverse age groups. Second, the children's and adolescents' digital literacy is self-reported, so it might have subjective bias and does not necessarily reflect their actual literacy. Thus, studies using objective measures of digital literacy should be conducted to validate the study's findings.

- - - - - Achilles, the Iliad IX, 500-506 - - - - -

Mother tells me,

the immortal goddess Thetis with her glistening feet,
that two fates bear me on to the day of death.
If I hold out here and I lay siege to Troy,
my journey home is gone, but my glory never dies.
If I voyage back to the fatherland I love,
my pride, my glory dies…

As Archiles chose glory over peace in obscurity, children of our time would do the same for their own future and humankind. The digital world is an explorative space of unchartered waters with darkness and light, uncertainties and possibilities, threats and challenges, pains and gains, guns and roses. So instead of wanting them back, why not light up a North Star in the sky?

Bon voyage!

Author Contributions: Conceptualization, Q.-H.V. and M.-H.N.; methodology, M.-H.N.; software, Q.-L.N; validation, Q.-H.V., M.-H.N. and T.-T.L.; formal analysis, M.-H.N. and Q.-L.N.; investigation, M.-H.N.; resources, M.-H.N.; data curation, M.-H.N.; writing—original draft preparation, M.-H.N., R.J., G.H., Q.-L.N. and T.-T.L.; writing—review and editing, R.J., G.H. and T.-T.L.; visualization, Q.-L.N; supervision, Q.-H.V.; project administration, Q.-H.V.; funding acquisition, R.J. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: The Vietnam National Institute of Educational Sciences has responsibility for this project. The study process has been approved and adheres to the ethical guidelines and regulations of the organisation in charge.

Informed Consent Statement: Written informed consent has been obtained from the patient(s) to publish this paper

Data Availability Statement: The data employed in this study were peer-reviewed and published in *Data in Brief*: https://www.sciencedirect.com/science/article/pii/S2352340921004467#bib0002.

Acknowledgments: Not applicable

Conflicts of Interest: The authors declare no conflict of interest.

Appendix

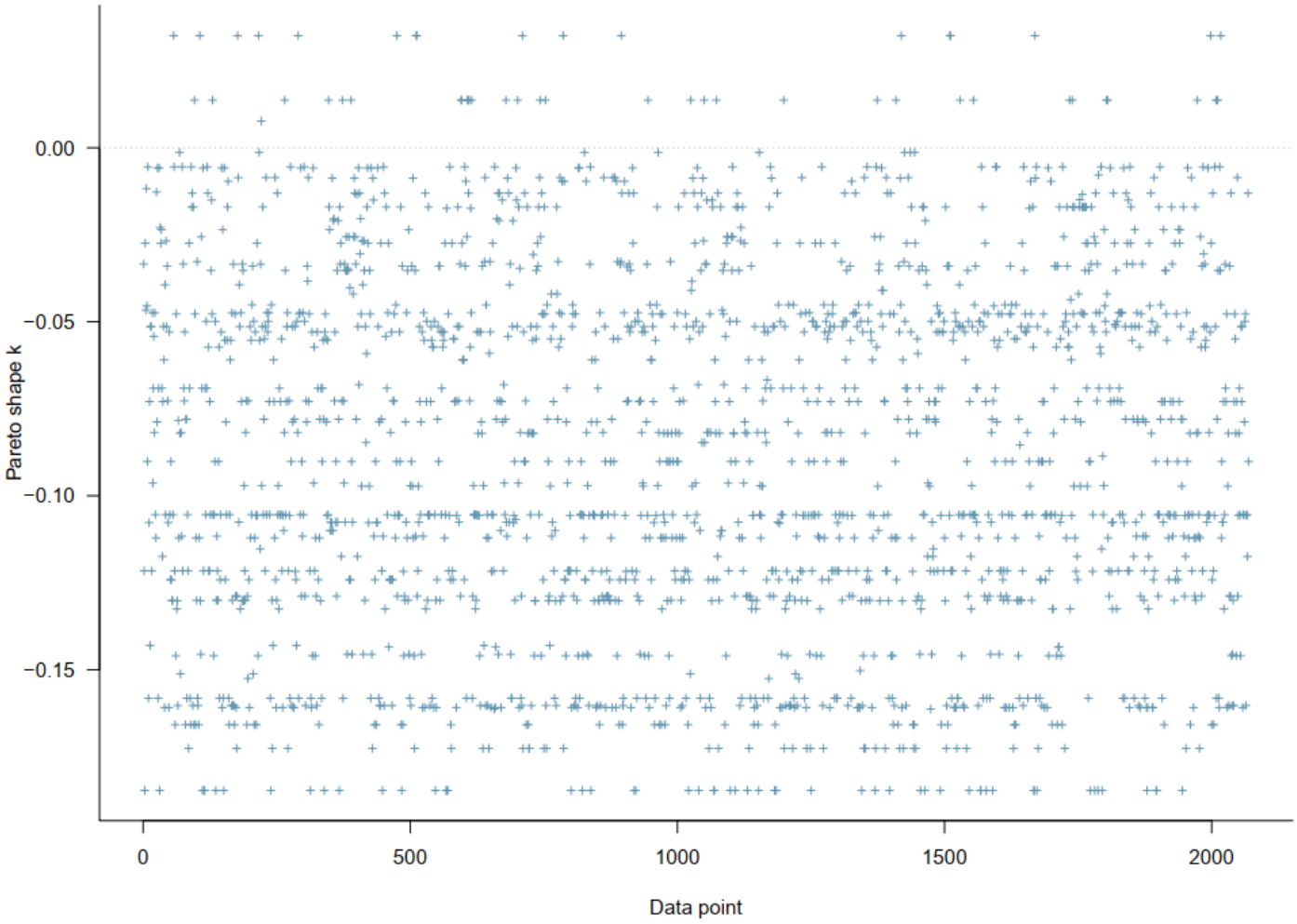

Figure A1. Model 2's PSIS diagnostic plot

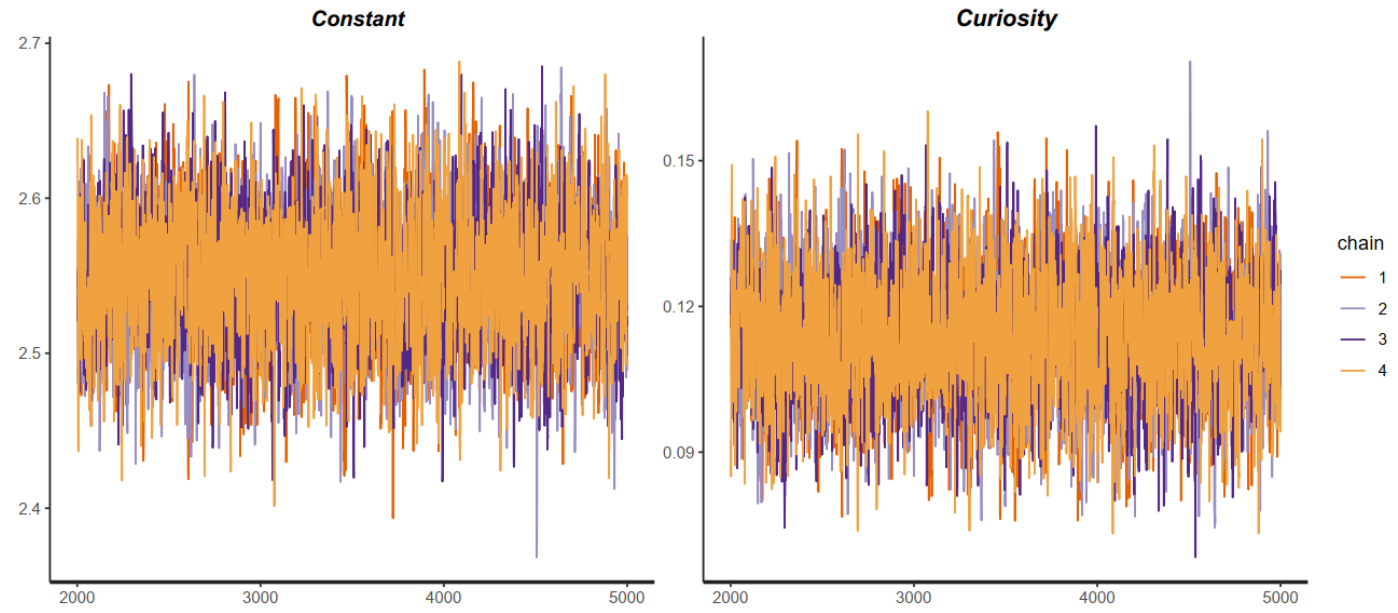

Figure A2. Model 2's trace plots

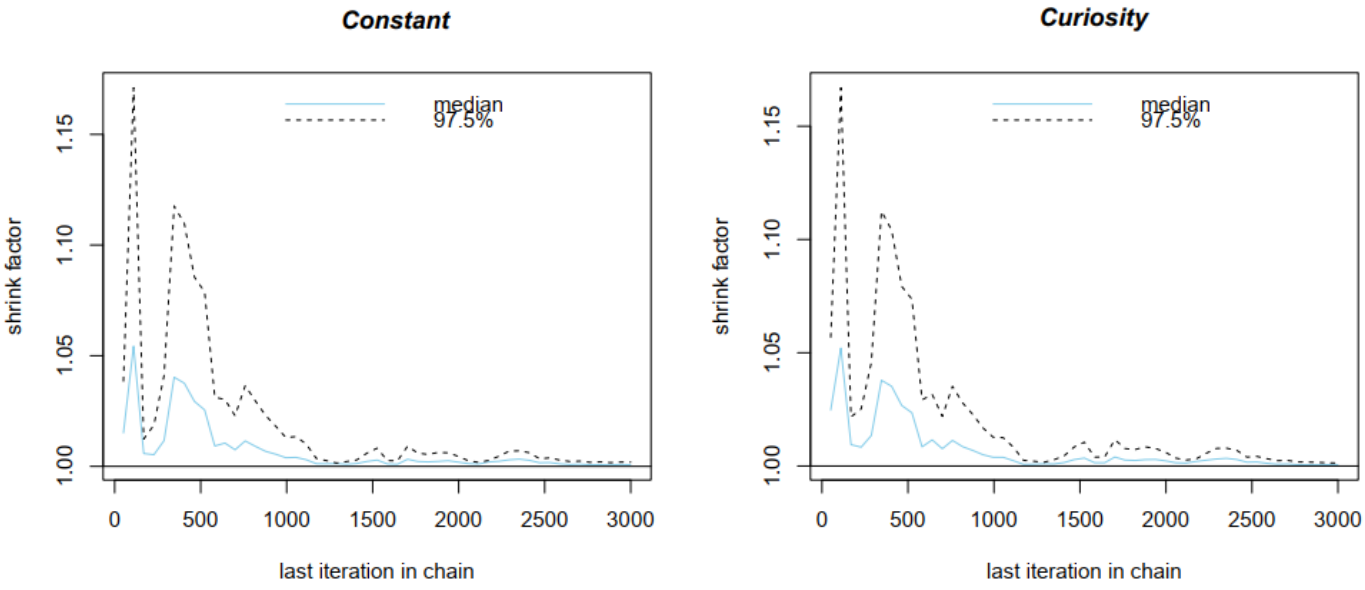

Figure A3. Model 2's Gelman-Rubin-Brooks plots

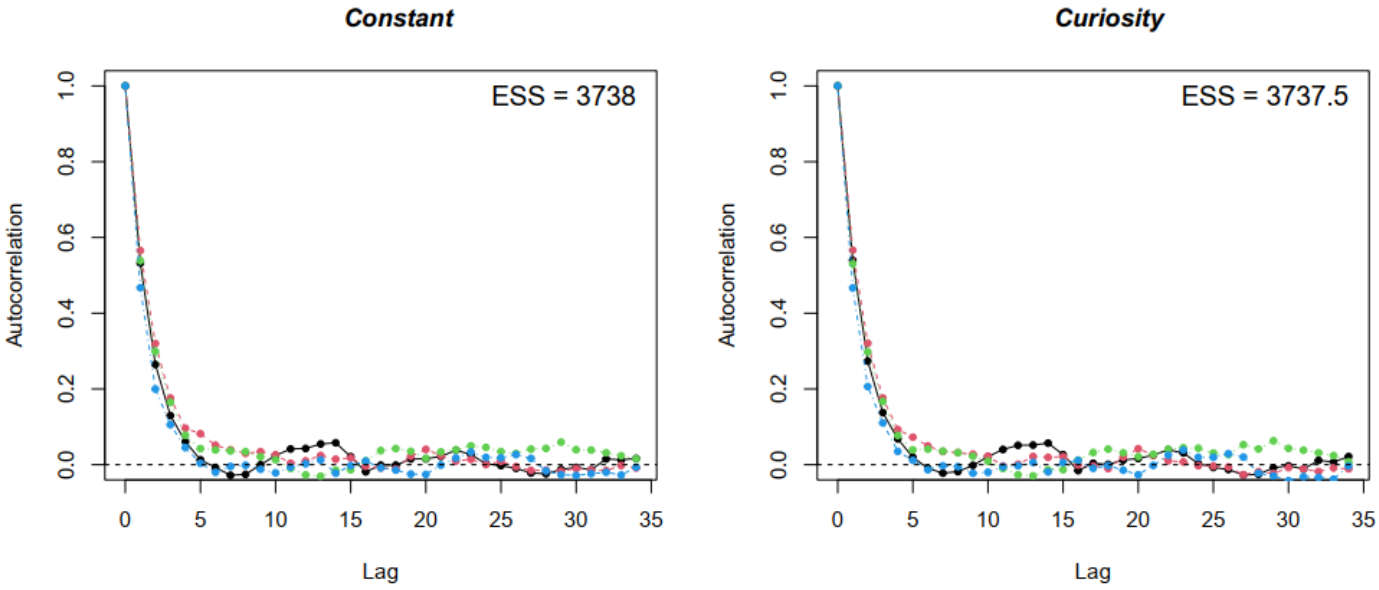

Figure A4. Model 2's autocorrelation plots

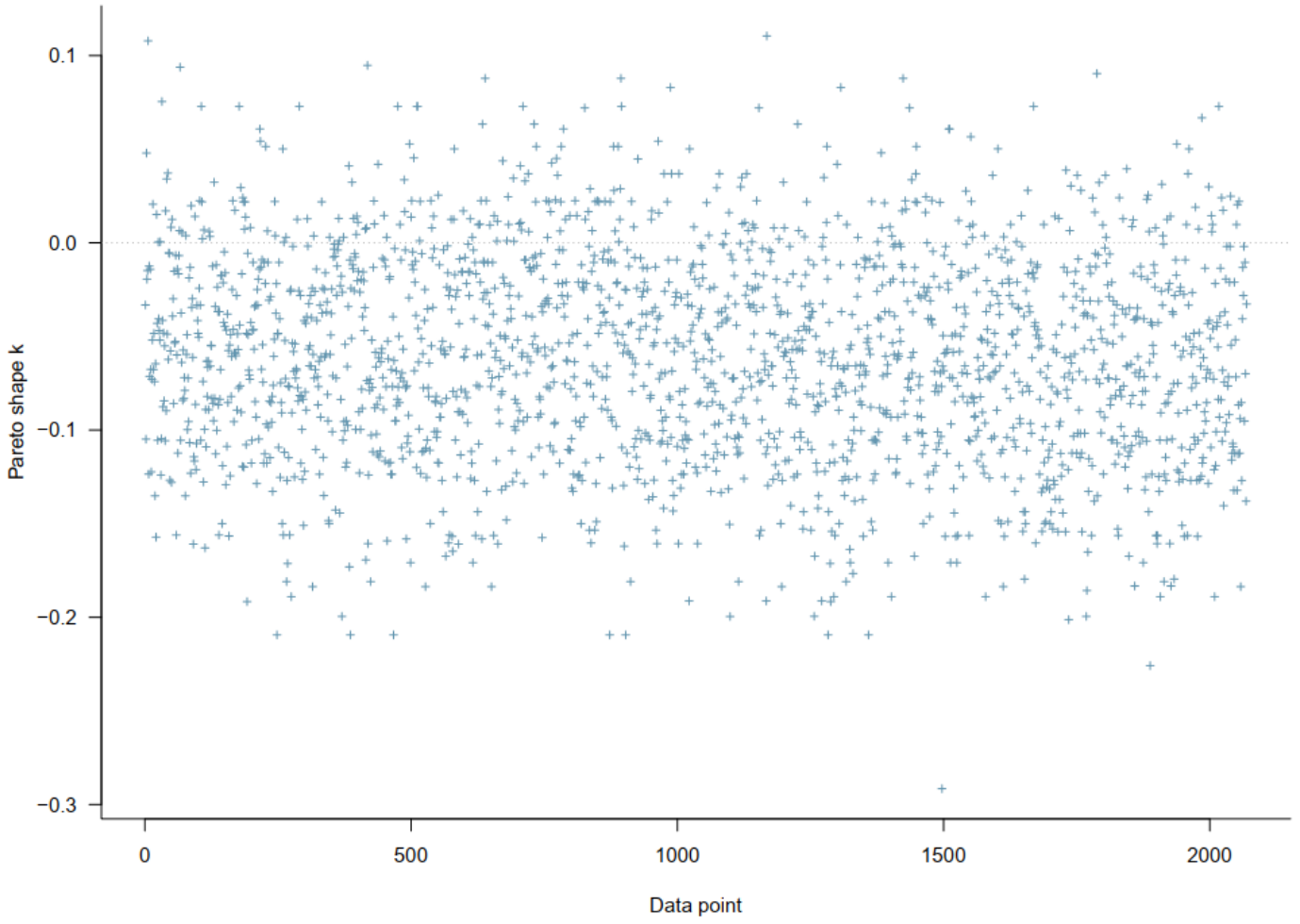

Figure A5. Model 3's PSIS diagnostic plot

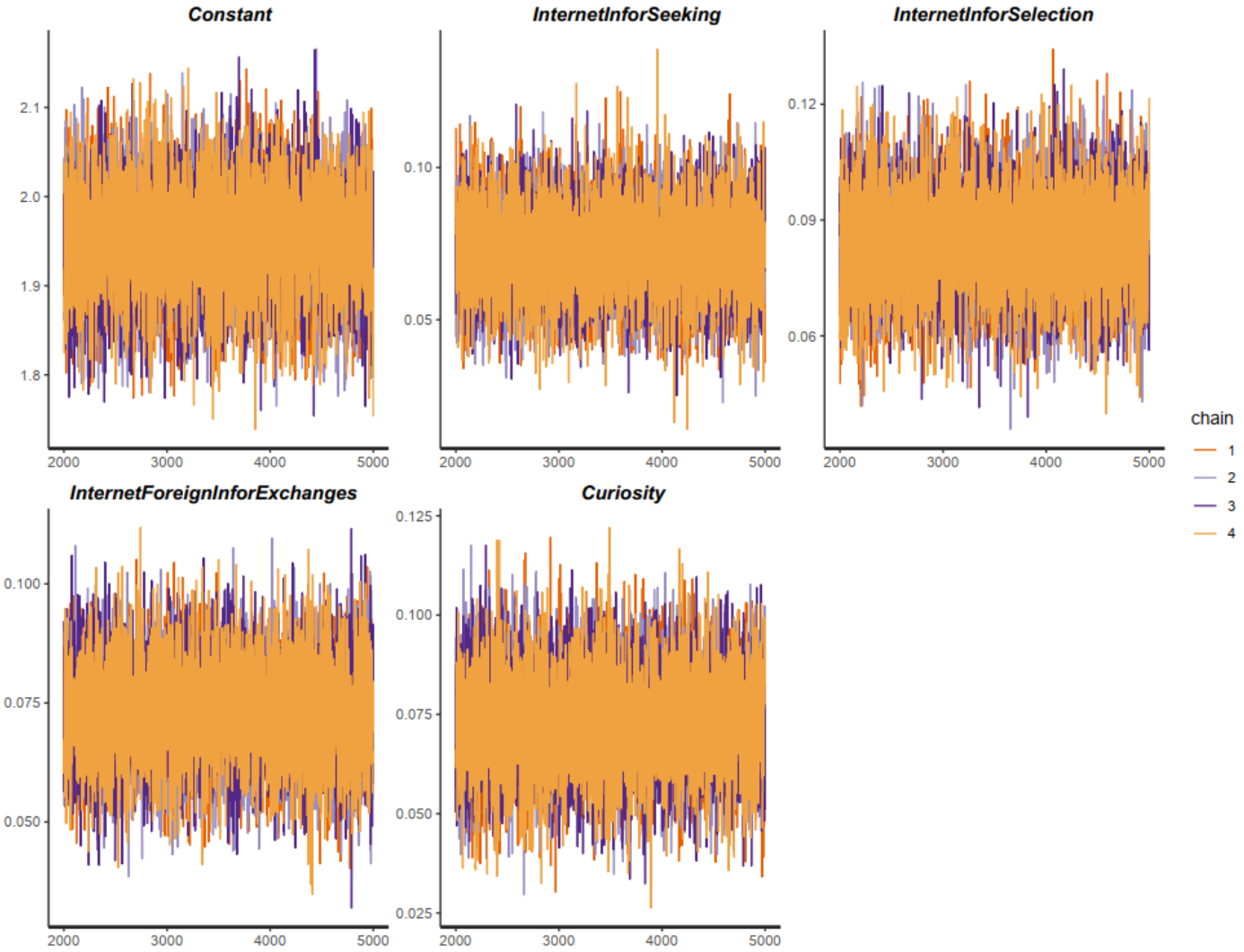

Figure A6. Model 3's trace plots

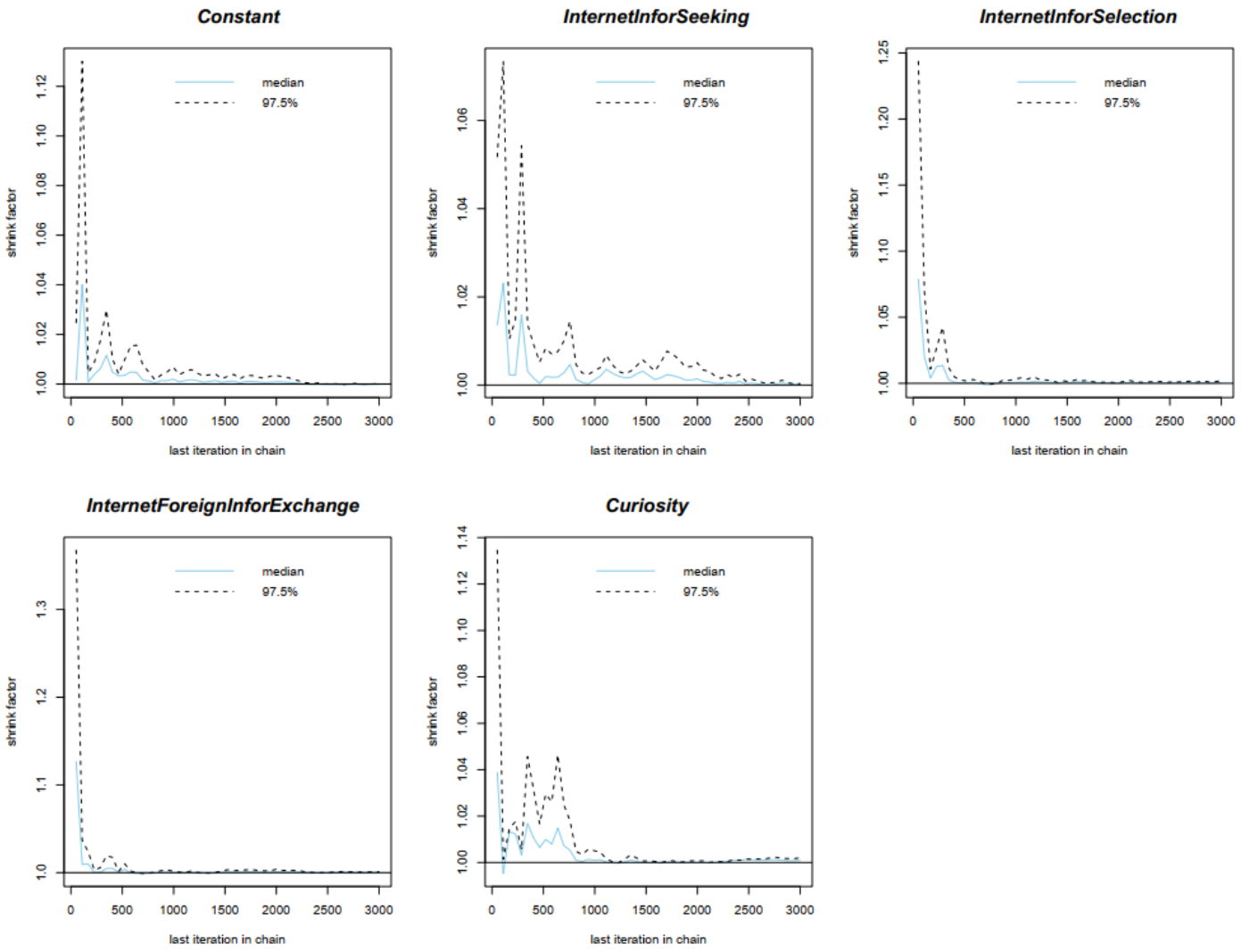

Figure A7. Model 3's Gelman-Rubin-Brooks plots

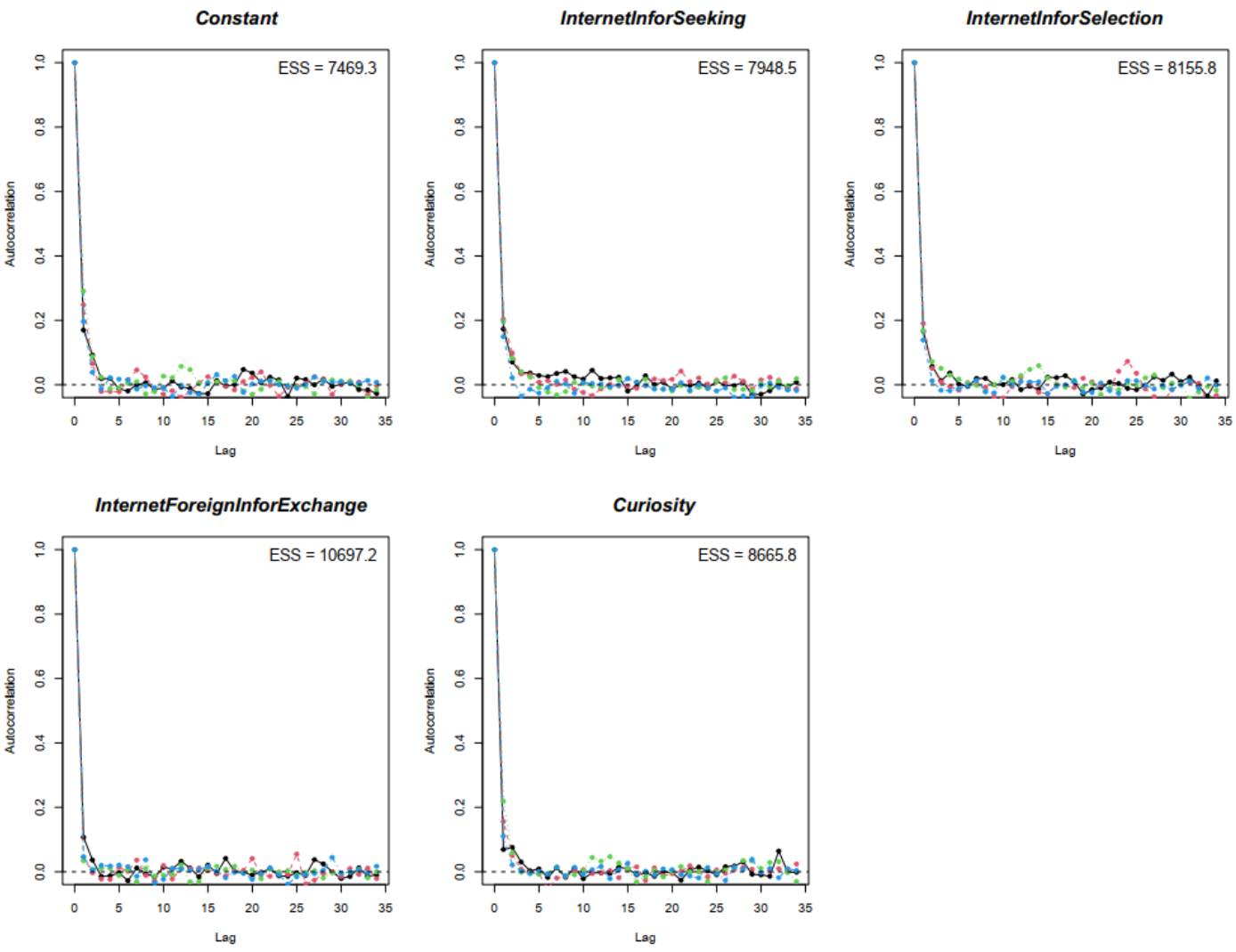

Figure A8. Model 3's autocorrelation plots

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