

CS6460 Assignment 3

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1 RESEARCH LOG

1.1 Background

Building upon last week's research, I delved deeper into 7 out of the 15 sources from the previous week, conducting more thorough readings beyond just the Abstract, Introduction, and Conclusion sections. I also identified additional papers that better align with my research project, allowing me to refine my study further. My primary progress up to this point includes the following:

- I have identified the graduate students as the target learner group to study and collect data.
- I will focus my research on how curiosity and internal motivation contribute to initiating learning behaviours before they begin.

In this week's exploration, I aim to gain further clarity on the following points:

- Learn more about how curiosity and intrinsic motivation can internally improve learning outcomes.
- Consolidate the resources from the previous weeks to see if I can form a complete logic chain for future research. If there are gaps, focus on filling up the gaps and completing the chain.

In addition, I would like to have a longitudinal overview of the three assignments to see if I can add any new findings or open questions to the final project.

1.2 Papers

1.2.1 *Paper 1 – Peer Reviewed*

Orcutt, J. M., & Dringus, L. P. (2017). Beyond Being There: Practices that Establish Presence, Engage Students and Influence Intellectual Curiosity in a Structured

Online Learning Environment. *Online Learning (Newburyport, Mass.)*, 21(3), 15–. <https://doi.org/10.24059/olj.v%vi%i.1231>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - The study analyzed data from six instructors to understand how they established teaching presence in a collective case context. While individual accounts varied, recurrent themes emerged in the instructors' actions, revealing three primary intentions: promoting engagement and interaction, forming authentic connections with students, and sharing experiences and knowledge.

Key takeaways – A cluster analysis highlighted key actions that supported these intentions, including building relationships, building rapport, and setting expectations. Additionally, the study explored practices related to setting the academic tone and inspiring intellectual curiosity, emphasizing the importance of clear expectations, and creating a collaborative atmosphere in the classroom.

1.2.2 Paper 2 – Peer Reviewed

Ha, Y., & Im, H. (2020). The Role of an Interactive Visual Learning Tool and Its Personalizability in Online Learning: Flow Experience. *Online Learning (Newburyport, Mass.)*, 24(1), 205–. <https://doi.org/10.24059/olj.v24i1.1620>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - The study conducted two experiments to investigate the impact of interactive visual learning tools on student learning experiences, performance, and satisfaction.

Key takeaways - The findings suggest that interactivity enhances telepresence, flow experience, and perceived usefulness and enjoyment. At the same time, personalization options for skill-challenge balance contribute to higher levels of curiosity, interest, and overall satisfaction in online learning, highlighting the importance of dynamic visual interactivity in online educational materials.

1.2.3 Paper 3 – Peer Reviewed

Karcher, E. L., Koltes, D., Wenner, B., & Wells, J. (2022). Sparking curiosity and engagement through an online curriculum. *Poultry Science*, 101(2), 101577–101577. <https://doi.org/10.1016/j.psj.2021.101577>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - To address the challenges posed by COVID-19, the author implemented a flexible hybrid laboratory approach in the bioscience laboratory, allowing students to choose between virtual and in-person participation. This approach helped maintain a safe environment while accommodating students' comfort and health circumstances.

Key takeaways – The critical factors for success included promoting smaller group discussions, reevaluating the necessity of on-site class tours, and prioritizing flexibility and student interaction over perfection in instructional materials.

1.2.4 Paper 4 – Peer Reviewed

Murayama, K., FitzGibbon, L., & Sakaki, M. (2019). Process Account of Curiosity and Interest: A Reward-Learning Perspective. *Educational Psychology Review*, 31(4), 875–895. <https://doi.org/10.1007/s10648-019-09499-9>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - This paper demonstrates the principles of the Reward-Learning Framework by distinguishing and comparing different interests and curiosities (e.g., Situational Interest vs. Individual Interest, Specific Curiosity vs. Diverive Curiosity).

Key takeaways – This paper not only walks me through the kinds of curiosity and motivation but also introduces the theoretical foundation of the Reward-Learning Framework.

1.2.5 Paper 5 – Peer Reviewed

Huang, Y.-C., Backman, S. J., Backman, K. F., McGuire, F. A., & Moore, D. (2019). An investigation of motivation and experience in virtual learning environments: a self-determination theory. *Education and Information Technologies*, 24(1), 591–611. <https://doi.org/10.1007/s10639-018-9784-5>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - This study aimed to identify factors motivating individuals in 3D virtual environments, focusing on Self-Determination Theory and hedonic constructs. The findings showed that autonomy and relatedness positively

influenced intrinsic motivation and flow experience, while perceived competence did not significantly affect hedonic experiences.

Key takeaways - Autonomy and relatedness were also linked to behavioural intentions, suggesting their importance in user experience and motivation in 3D virtual environments for education and training.

1.2.6 Paper 6 – Peer Reviewed

Litman, J., Hutchins, T., & Russon, R. (2005). Epistemic curiosity, feeling-of-knowing, and exploratory behaviour. *Cognition and Emotion*, 19(4), 559–582. <https://doi.org/10.1080/02699930441000427>

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - This paper first assesses the criterion validity of three types of Feeling of Knowing (FOK) states, indicating that more intense FOK states are associated with smaller knowledge gaps and better memory accuracy, followed by exploring the relationship between FOK, state epistemic curiosity, and exploratory behaviour. Then, it examines the correlations between epistemic curiosity traits and states, FOK, and exploration.

Key takeaways: FOK states are associated with varying levels of curiosity and exploratory behaviour, minor to moderate positive correlations between state curiosity and exploration for different FOK states, and some unexpected findings related to "TOT" states and ceiling effects in the curiosity ratings.

1.2.7 Paper 7 – Peer Reviewed

Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and Exploration: Facilitating Positive Subjective Experiences and Personal Growth Opportunities. *Journal of Personality Assessment*, 82(3), 291–305. https://doi.org/10.1207/s15327752jpa8203_05

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary - The study conducted various analyses to assess the validity and relationships of the CEI-Exploration and Absorption scales with other measures. Exploration and Absorption showed strong positive correlations with curiosity measures, Openness to Experience, domain-specific curiosity scales, appetitive motivations, and activated positive affective states.

Key takeaways – Exploration had stronger relationships than Absorption with many of these variables, while Absorption had stronger associations with idiographic striving dimensions. The study also found that positive affect influenced the CEI correlations, but the CEI scales maintained significant relationships with various measures even after controlling for positive affect.

1.2.8 Paper 8 – Peer Reviewed

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – The review discusses the distinction between intrinsic and extrinsic motivation, emphasizing that motivation is not a unitary phenomenon but varies in amount and type.

Key takeaways – Intrinsic motivation is characterized by doing something for its inherent interest or enjoyment, while extrinsic motivation involves doing something for a separable outcome.

1.2.9 Paper 9 – Peer Reviewed

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Removing obstacles to the pedagogical changes required by Jonassen's vision of authentic technology-enabled learning. *Computers & Education*, 64, 175-182.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – This article calls for a shift in education from technology integration to technology-enabled learning, emphasizing the importance of using technology to engage students, with implications for supporting pedagogical change.

Key takeaways – This article helped me further understand the possible place of technology in helping people learn. In my research, technology-enabled learning is also the primary subject of discussion.

1.2.10 Paper 10 – Peer Reviewed

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational psychologist*, 41(2), 111-127.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – This article presents a 4-phase model of interest development, encompassing triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest while emphasizing the importance of educators' roles in fostering interest in students and addressing misconceptions about interest development.

Key takeaways – My research can be based on the text's 4-phase interest development model to explore technology's impact on developing student interest in each phase.

1.2.11 Paper 11 – Peer Reviewed

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational psychologist*, 26(3-4), 325-346.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – This paper states that promoting self-determination in individuals, particularly in education, fosters creativity, cognitive flexibility, and self-esteem. Autonomy support and interpersonal involvement from significant adults, like teachers and parents, play a pivotal role in nurturing self-determined motivation in students.

Key takeaways – This article gave me a different perspective - offering choices, minimizing controls, acknowledging emotions, providing necessary information and stimulating students' internal motivation contribute to creating educational environments that enhance conceptual understanding, problem-solving skills, personal development, and social responsibility.

1.2.12 Paper 12 – Peer Reviewed

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of personality and social psychology*, 87(2), 246-260.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – The study used various samples, tasks, and outcomes to investigate the effects of framing tasks consistent with basic psychological needs and found consistent support for Self-Determination Theory (SDT) predictions, demonstrating that aligning tasks with the satisfaction of psychological needs led to positive learning outcomes.

Key takeaways – This study suggests that teachers who utilize intrinsic goals in framing learning activities and create autonomy-supportive learning environments can significantly enhance students' dedication and engagement in learning activities.

1.2.13 Paper 13 – Peer Reviewed

Wigfield, A., & Cambria, J. (2010). Students' achievement values, goal orientations, and interest: Definitions, development, and relations to achievement outcomes. *Developmental Review*, 30(1), 1–35.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – The article discusses the significance of constructs related to achievement motivation, particularly achievement values, goal orientations, and interest, which collectively influence individuals' motivations and academic achievement.

Key takeaways – The review primarily focuses on research conducted with elementary and secondary school students, which differs from my research group. I will not continue my reading of this paper going forward.

1.2.14 Paper 14 – Peer Reviewed

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, 134(2), 270–300.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – The meta-analysis suggests that allowing individuals to make choices enhances motivation, persistence, performance, and production, affirming the importance of autonomy. However, it also highlights that the positive effects of choice can diminish in circumstances where the self-regulatory costs of decision-making become excessive and when autonomy is undermined, which has

significant implications for various aspects of human functioning and interpersonal relationships.

Key takeaways – This paper prompted me to think that perhaps what would be more effective than the traditional approach to education would be to minimize interventions in students' learning process.

1.2.15 Paper 15 – Peer Reviewed

Patall, E. A., Dent, A. L., Oyer, M., Wynn, S. R., & Dent, A. L. (2013). Student autonomy and course value: Various teacher practices' unique and cumulative roles. *Motivation and Emotion*, 37(1), 14–32.

This is a search result from ChatGPT, verified in the Georgia Tech Library.

Summary – The study highlights the importance of specific teacher practices in supporting students' autonomy and motivation. Providing choices and perspective-taking was found to be particularly crucial for autonomy and need satisfaction.

Key takeaways – This article discusses what teachers can do to improve student initiative in learning. Given that my research is more about discussing the case of online learning, I will not continue to read this article as we advance.

1.3 Synthesis

The papers reviewed reveal key insights into fostering engagement and curiosity in online learning environments. Paper 1 by Orcutt and Dringus emphasizes the importance of establishing a teaching presence and forming authentic student connections. Paper 2, conducted by Ha and Im, underscores the significance of interactive visual learning tools and personalization options for enhancing curiosity and satisfaction in online learning. In Paper 3, Karcher et al. advocate for flexibility and student interaction in response to COVID-19 challenges. Paper 4 by Murayama et al. delves into the Reward-Learning Framework, providing a theoretical foundation for understanding curiosity and interest. Paper 5, authored by Huang et al., highlights autonomy and relatedness as key factors motivating learners in virtual environments. Litman, Hutchins, and Russon's Paper 6 explores the relationship between curiosity, feeling of knowing (FOK) states, and exploratory behaviour. Paper 7 by Kashdan et al. emphasizes the role of curiosity in facilitating personal growth, with exploration being a significant factor.

Paper 8, authored by Ryan and Deci, distinguishes intrinsic and extrinsic motivation, offering insights into motivation types. Paper 9 by Ertmer and Ottenbreit-Leftwich discusses the shift towards technology-enabled learning to engage students effectively. Paper 10 by Hidi and Renninger presents a four-phase model of interest development, emphasizing the educator's role in fostering interest. Deci et al.'s Paper 11 underscore the importance of self-determination in education and its positive impact on motivation and learning. Paper 12 by Vansteenkiste et al. supports the Self-Determination Theory, emphasizing that aligning tasks with psychological needs enhances learning outcomes. Paper 14, a meta-analysis by Patall et al., highlights the benefits of choice in enhancing motivation but cautions against excessive decision-making. Lastly, Paper 15 by Patall et al. emphasizes specific teacher practices, such as providing choices and supporting student autonomy and motivation. These papers offer valuable insights into promoting engagement, curiosity, and motivation in online and traditional learning settings.

Open questions that arise from these trends are as follows:

1. How can online educators effectively balance the need for flexibility, as highlighted in Paper 3, with establishing teaching presence and authentic connections with students, as emphasized in Paper 1, to create engaging and inclusive virtual learning environments?
2. Building on the findings of Papers 11 and 12, what concrete strategies can educational institutions employ to create autonomy-supportive learning environments that promote intrinsic motivation, enhance student dedication, and foster a love for learning?

I have tentatively refined what I want to argue in my final project; a logical chain from intrinsic motivation and curiosity to student engagement to better education quality and learning outcomes in an online environment has been initialized. I will use this chain as a blueprint for discussion in my final project, addressing the above open questions.

1.4 Reflection

In this week's resource-finding process, I first sifted through last week's research logs to find seven papers that were more specific to my current research direction and then used ChatGPT to help me list more papers about the relationships

between students' motivation and learning outcomes, followed by the verification of each source on Googled or GT Digital Library. Another exciting discovery was that ChatGPT gave me different search results sometimes. Through these different source lists, I found an incomplete logic chain in the research I plan to conduct.

For the papers I read last week, I focus on and understand the data and related analysis provided; for the new paper, I start with the Abstract, Introduction and Conclusion to understand the content, followed by the thorough reading next week. Finding existing data to support my research was challenging, although I have found myself more comfortable finding resources across the fields this week.

In this week's research, I have tentatively initialized a logical chain from intrinsic motivation and curiosity to student engagement to better education quality and learning outcomes in an online environment. I will use this chain as a blueprint for discussion and further research in my final project.

1.5 Planning

In my research for the next week, I will be focusing on the following:

- Finish reading the outstanding sources listed above in the research log.
- Further research on Kaggle for possible off-the-shelf databases and get an initial idea of the survey I plan to design.
- Clarify the requirements of qualifier questions and start framing the content.
- Integrate content from Assignments 1 to 3 and draft the Introduction and Background sections for the final project.

On top of that, I need to inventory whether I have all the resources to start the final project and be prepared for the following weeks.

2 ACTIVITY

In this activity, I will complete the Problem Statement and Research Questions exercises around the relationship of intrinsic motivation, curiosity and human learning to give better feedback to my classmates for the future.

2.1 Problem Statement

2.1.1 Background Information

The Internet era has undoubtedly brought much convenience to people, and a variety of software learning tools is one of them. However, the efficacy of these tools in enhancing students' learning outcomes remains a topic of debate.

2.1.2 General Problem Statement

While there is a widespread assumption that these tools should significantly benefit students' learning, the outcomes improve less than we expected.

2.1.3 Scholarly Support

When intrinsically motivated, students are more likely to engage in deep learning, seek challenges, and persist in facing difficulties because they learn based on their interests, enhancing their focus and commitment to the subject matter (Ryan & Deci, 2000).

Ertmer and Ottenbreit-Leftwich (2013) argue that the successful integration of technology in education relies on factors such as pedagogical approaches and teacher preparation, emphasizing that technology's mere availability does not guarantee improved learning outcomes.

2.1.4 Specific Problem Statement

While Education Technology focuses on the methodology of human learning, subjective learning initiatives and motivations play a pivotal role in achieving more efficient learning.

2.1.5 Closing Commentary

As society continues to embrace technology in education, it is imperative to critically examine the role of these tools in shaping students' learning. This problem statement highlights the need for a comprehensive assessment of the effectiveness of technology-driven learning and the recognition that subjective initiatives may hold the key to better outcomes. Addressing this issue is vital to guide educators, policymakers, and ed-tech developers in making decisions regarding the use of technology in education, ultimately aiming to enhance the quality of learning for all.

2.2 Research Questions

How can education technology enhance student learning performance by increasing students' intrinsic motivation and curiosity?

2.2.1 Sub-question 1: To what extent can education technology make sense of students' intrinsic motivation and curiosity?

Complexity – instead of seeking a straightforward yes or no, this question delves into the extent to which education technology can understand students' learning behaviours: intrinsic motivation and curiosity. By asking "how," this question leads to multifaceted answers that explore the mechanisms, tools, and strategies involved in assessing and understanding these psychological states in students.

Arguability – The question is arguable because it pertains to empirical investigation and facts. It can be addressed through research and evidence collection rather than relying on opinions or subjective viewpoints.

The answer should emphasize that the effectiveness of education technology in understanding intrinsic motivation and curiosity is contingent on various factors, including the methods employed, data quality, context, and individual differences. Data analytics, AI algorithms, or learning tools for assessing and understanding students' intrinsic motivation and curiosity can support these answers.

2.2.2 Sub-question 2: To what extent can education technology use that understanding to engage students?

Complexity – This question seeks to understand the relationship between education technology, student engagement, and the understanding of students' motivations, which are interconnected and not easily reducible to simple answers.

Arguability - This question can be addressed through factual and empirical research exploring existing educational technology practices, the dynamics of student engagement, and various research perspectives on students' motivation in education, which may vary across different studies.

The answer to this question comes from various sources, including controlled experiments, surveys, interviews, classroom observations, and academic studies. The supporting data can be collected from student learning outcomes, technology usage patterns, and perceptions of technology's impact on their motivation.

Interviews or open-ended questions can also be implemented to understand students' learning experiences and perspectives better.

2.2.3 Sub-question 3: *To what extent does such engagement improve students' performance?*

Complexity – This question requires a nuanced examination of the relationship between engagement and performance, which goes beyond a surface-level inquiry by "to what extent" and thus seeks to explore the degree or magnitude of the effect. This complexity invites a more in-depth investigation into factors that might influence the relationship.

Arguability – The question is arguable because researchers can draw different conclusions from various perspectives, which can be affected by data bias and personal opinions. Therefore, this question is debatable and refined in the academic discourse.

It is important to note that the quality of the answer and the rigour of the data analysis play a crucial role in determining the credibility of this research. Quantitative data (e.g., test scores, GPA) and qualitative data (e.g., interviews, observations) can be helpful to understand the relationship between engagement and student performance comprehensively.

2.3 References

1. Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67.
2. Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Removing obstacles to the pedagogical changes required by Jonassen's vision of authentic technology-enabled learning. *Computers & Education*, 64, 175-182.