Innovating Education: Leveraging Constructivism, AI-Enhanced VR, and Adaptive Learning Platforms for Immersive Learning Experiences

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Introduction

The development of learning theories over time has grown alongside the technology used in classrooms and other training environments. Present technological innovations include virtual reality (VR), artificial intelligence (AI), and adaptive learning platforms, however from the onset, the practitioners of the learning theory behaviorism from the early 20th century utilized available technologies and incorporated a type of differentiated instruction called programmed instruction. This instruction was used in learning environments to tailor the lessons to individual student needs. In the 1950s B.F. Skinner modified Sidney Pressey's original testing machines of the 1920s to incorporate actual instruction that presented the information to students in small steps and then provided feedback for wrong answers (Schunk, 2020). Beyond merely using technology for conditioning, Frederic Bartlett uncovered and developed "schema theory" which contended that memory is a process of reconstruction (Bartlett, 1995), and cognitive theories like Cognitive Information Processing (CIP) became more widely used in teaching. History shows that technology is often adapted in educational settings to better address how learners process and retain information. Moving forward, Social Cognitive Theory was then introduced by Albert Bandura and conceptualized that learning is most effective by social techniques like observation and modeling, and he emphasized that interactions between people, behaviors, and the learning environment is most important in educational settings (Schunk, 2020). In today's world VR and AI simulations are still influenced by social cognitive theory, and research shows how feedback and social rewards are used to support learning. In a recent study, Hu et al. (2024) prove that "the emphasis on social rewards as a significant factor influencing anxiety-related neural patterns [is] important for creating more advanced and context-aware computational models" (Hu et al., 2024, p. 11). Social rewards are important in the VR environment, but the most effective theory to consider when incorporating AI into the VR environment was popularized in the late 1990s and is called constructivism. From the constructivist perspective, knowledge is not derived from

external truths, but is formed internally by the learner (Schunk, 2020). Internal constructs of meaning well exceed the impact of social constructs of meaning, and this paper will focus on how constructivism in VR and AI assisted learning environments is used for scenario-based learning experiences to simulate real-world situations, delivering more impact to real challenges in the learners' performance context than behaviorist and cognitivist theories. While these theories are still popular in VR environments, practitioners of behaviorist and cognitivist theories often prioritize structured, teacher-driven approaches to learning that are becoming less relevant with this new technology. Song et al. (2023) recommend "grounding VR tools in solid educational theories can magnify their potential" (p.5) and overcoming limitations like "technical requirements and issues, physical discomfort, over-reliance on technology, and privacy and data security concerns" (p. 28) will be crucial for educators. This paper argues that the advancement of VR in conjunction with AI and the learning theory of constructivism will become paramount in these learner-centered environments, specifically adaptive learning platforms, and will help prove that these technologies provide the ideal environment for experiential, personalized learning to foster deeper engagement and understanding, now and in the future.

Constructivist Learning in Immersive VR Settings and Generative AI

Virtual reality (VR) is often associated with gaming, or even immersive experiences at theme parks and aquariums rather than the go-to tool for educational environments to address specific learning challenges. However, in his TEDx talk *VR and AI in Education: The Future of Learning*, Kristen Tamm suggests that pairing VR devices like the Quest 2 with large language models like ChatGPT can transform education by creating immersive environments that address the global teacher shortage (Tamm, 2023). Tamm (2023) argues that VR, paired with AI tutors can allow students to take full control of their learning pace while staying completely focused,

and that the learning process is experienced in a highly immersive and sensory-rich 3D environment (Tamm, 2023). Tamm envisions how educational technologists of the future will use these technologies to fill instructional gaps in K-12 and presents the real-life example of a school's educational technologist who now fills the role as a geography teacher due to the impact of this technology (Tamm, 2023). There is impact that extends beyond the K-12 classroom and into language learning using VR. Research by Song et al. (2023) help examine how VR learning experiences enhance language learning by using a constructivist framework and by what they call a "cognitive load framework" that balances experiential engagement with cognitive load limitations and show how the technology adapts to learners' needs, specifically in the Duolingo VR and Rosetta Stone VR platforms. If language learning can be enhanced through VR, then educators and institutions also need to consider the various uses of VR in combination with AI that can provide hands-on learning experiences that can allow for more allowances to make mistakes without damage to the learner, the environment or other students in simulated settings with training that can be personalized to each learner.

Given that knowledge is personal and subjective, and depends on context, there is a natural connection to VR experiences and constructivism, where immersive environments offer personalized and contextual learning. Constructivism is not considered a theory per say, but an epistemology that explains the nature of knowledge, as it posits that learners actively create their own understanding (Schunk, 2020). As Cobb and Bowers (as cited in Schunk, 2020) state, "People construct knowledge based on their beliefs and experiences in situations, which differ from person to person" (p. 315). Going back in time with an earlier study, Dalgarno & Lee (2010) highlighted the benefits of 3-D virtual learning environments (VLEs) and established a theoretical base to support researchers and practitioners in the field of VR games and simulations

and helped lay a groundwork for more appropriate applications of this technology. They conclude that when factual information is learned in the 3-D environment, "there will be a greater transfer of learning to the corresponding real environment... result[ing] in greater spacial learning than would occur when passively viewing an equivalent animation or video" (Dalgarno & Lee, 2010, p. 25). In their elaborated model of learning in 3-D VLEs, Dalgarno & Lee (2010) highlight "experiential learning, engagement, contextual learning, and collaborative learning" (p. 24) as the benefits to using VR in learning contexts, well before the integration of AI into the environment. This research reflects the constructivist notion of situated cognition where learning is considered highly effective in the actual environment and context of which the transfer needs to occur (Schunk, 2020, p. 318). In more recent studies discussing generative AI (GenAI) aligning with constructivism, Salinas-Navarro et al. (2024) show how GenAI tools support the constructive learning process by promoting immersive experiences, personalized learning pathways, and dynamic problem-solving scenarios to further examine how AI tools like ChatGPT help develop what they call authentic assessments, and will become a more critical tool in this environment.

AI-Powered Adaptive Learning for K-12, Higher Ed and Professional Training

The creation of adaptive learning technology (ALT) has marked a major advancement in education and training, offering a more personalized approach to learning compared to traditional classroom and e-learning methods (Gordon, 2020). His research shows that ALT "provides a true one-to-one and highly personalized artificial intelligence augmented ALT teaching assistant and a human teacher relationship with the learner that focuses on achieving mastery without traditional time constraints and subject barriers" (Gordon, 2020, p.2). Gordon, in his dissertation leans into the constructivist notion of discovery learning because of the ALT

emphasis on self-regulation, even going as far as to suggest eliminating grade levels entirely. In more recent constructs of ALT using AI, Dutta et al. (2024) call the AI powered versions "adaptive learning platforms" (ALPs) and have written a comparative analysis of four prominent platforms used in K-12 education; Carnegie Learning, DreamBox Learning, Smart Sparrow, and Knewton. This study provides educators in the modern context with insights and further defines the roles of teachers in these new environments. ALPs use AI and algorithms to "assess a student's understanding and then adjust the learning materials and activities accordingly" (Dutta et al., 2024, p.1). Moving away from K-12 and towards the professional realm, there are studies of many kinds to support this. One study conducted on VR training for railway conductors show how these AI assisted VR platforms with ALPs keep learners inside a 'flow channel' that Göbel and Wendel (2016) defined as a perfect balance between anxiety and boredom in relation to skill and challenge (Abbas et al., 2023). The connection to constructivism in this case comes from their reference to Fowler's (2015) notion of "task immersion" that is a primary contributor to experiential learning and describes how the focus in this environment is placed on knowledge construction instead of reproduction (Fowler, 2015 as cited in Abbas et al., 2023, p. 3702). These studies along with others help prove the shift from behaviorist and cognitivist strategies to constructivist ones and helps demonstrate how the teaching profession will inevitably need to evolve into a more facilitative role compared to the past to align learning objectives with these technologies.

Personalized Corporate Training Through VR and AI Learning Platforms

In order for teachers to take on a more facilitative role in training with VR simulations, they will need to receive up-to-date training on how to integrate constructivist principles into VR curriculum design, how to work with developers to create content, how to use feedback from

students, and what the latest research is on the topic (Song et al., 2023). The evolution of use cases for VR in the workplace has been prevalent from the late 1990s until the present, and there are multiple studies that showcase the various iterations. In a comprehensive review of construction engineering training, Wang et al. (2018) cite the benefits of desktop-based VR, immersive VR, 3D game-based VR and augmented reality (AR) in many subtopics including architecture design, construction health and safety, equipment operation and structural analysis. They found that on-the-job training in these arenas is often impossible because on-site conditions are not revealed until work begins, so the VR training helps to address these practical problems in education and training of the employees in difficult hands-on contexts (Wang et al., 2018). A similar study examines how AI has been introduced in robotics training to include machine learning (ML) and natural language processing (NLP). In their research Peterson et al. (n.d.) determine "AI-assisted Adaptive Learning Systems (ALS)... are designed as a series of modular microlessons allowing learning content to be strategically rearranged based on learner performance" (p. 16) and are explicit in how they drew from constructivist and experiential learning theories in the process of developing the curriculum.

There are numerous companies in the current marketplace offering services to train various skills in the workplace using AI assisted VR learning. The edtech company Mursion is a leader in the field, and state on their website that simulations are the preferred method for executives down to field workers to master human skills with their software, similar to how pilots train using simulators "giving leaders the opportunity to practice high-stakes interactions in emotionally charged situations without incurring the risk of doing harm to customers or colleagues" (Mursion, 2023). More companies including Strivr have proclaimed to already have launched over two million training sessions and use extended reality (XR) and generative AI

(GenAI) to produce soft skills training, providing access to a more natural and dynamic conversational training repertoire than ever seen before (Strivr, 2024). Strivr was formed in 2015 at Stanford and offers VR training that covers nearly every industry the platform will streamline operational and procedural training like: onboarding, compliance training, new technology training, process training, and inventory management (Strivr, 2024). These trainings often occur in what they call the "virtual metaverse" where learners can train in a constructivist learning environment. Zhou et al. (2024) state the metaverse is a true representation of social constructivism because of how real-life global problems can be addressed from different perspectives in areas focused on climate geoengineering, water management, cybersecurity, and global competence. Saaed et al. (2024) profusely expand on the benefits of "real-time collaboration, enhanced practicality, alignment with technology training, real-time feedback analytics, and customizable learning environments to be the positive aspects of metaverse-based training programs" (p. 12).

Constructivism and the Metaverse in VR Higher-ed Learning

VR training in the metaverse environment extends beyond corporate and human resource management training towards the sphere of higher education, and the use of constructivism has been thoroughly examined in this context. The metaverse is more than a gaming platform or a place to buy virtual real estate. The benefits of using a constructivist approach to designing curriculum in the "edu-metaverse" has been researched by Sin et al. (2023), and they prove how immersive learning, visual literacy, and collaborative learning will be critical in this learning environment. Their research examines how the edu-metaverse will have "a knowledge hub for displaying multimedia content; avatars that facilitate multiuser discussion of educational content; an open platform for connecting immersive learning content, learning content creation; and

social features for personalized learning" (p. 2), and have created a prototype called Knowledge-Cube VR with overall positive benefits on learners, except ill effects like "VR-fatigue" and others noted in this paper below. In a more recent study using Knowledge-Cube VR, Jia et al. (2024) concluded that, in comparison to Zoom calls, activities in the edu-metaverse like mind-mapping can be more effective for implementing the constructivist strategy of collaborative learning. Sidhu et al. (2024) describe this positive learning environment as part of "Education 5.0," highlighting how learners become skilled in complex problem-solving through VR constructivist activities. These activities include active learning, collaboration, and project-based learning. The study showcased Malaysian engineering students who used the metaverse to integrate real-world experiences into their education (Sidhu et al., 2024). Engineering education is essentially being transformed via the metaverse by how it creates "a more immersive interactive experience, better visualization, reduced learning costs and risks, not limited by time and space, prevents academic misconduct, [is] personalized, and promotes communication" (Sidhu et al., 2024, p. 15).

Challenges in Scaling VR and AI for Education

There is a plethora of benefits in adopting this technology, but also multiple challenges that are associated with adopting AI enhanced VR experiences in K-12, corporate, and higher education sectors. Adopting VR and AI assisted technology in the metaverse to include adaptive learning has steep but not unmitigable challenges including a steep learning curve, high costs of implementation and ongoing maintenance, some academic challenges, and behavioral, ethical and privacy concerns (Sidhu et al., 2024, p. 15). Jia et al. (2024) found an issue with VR environments containing various distractions located within the metaverse that increased lack of

attention from the learners, creating a dilution of attention, and "a noticeable uptick in off-task conversation" (p. 10). Also concerning, due to costs and access to VR tech, is a skillset disconnect between people with and without access, raising concerns about how to enhance inclusion and equity in the metaverse learning space (Zhou et al., 2024). In addition to access concerns, issues with privacy and security for storing information in the metaverse will need to be addressed from both a corporate human resource perspective and educational perspective (Saaed et al., 2024). More examination uncovers opposition stemming from psychologists, lawyers, sociologists, philosophers, and journalists who question the social and psychological effects of participating in the metaverse including detachment from physical reality, addiction to virtual identities, the likely worsening of criminal and antisocial behavior, and fear that users will inevitably lose control of their behavioral data which can in turn be exploited by large companies (Dolata & Schwabe, 2023). My hypothesis is that some of these problems from the learner's perspective can be solved through the tenants of constructivism like active and reflective learning, where users engage critically after the VR experiences to foster a more self-awareness and responsibility to consider the consequences of their actions in this virtual environment, and many problems will need to be solved through regulation by collaboration between governments through ethical practices and a form of humane AI/VR adaptive learning platform model.

Redefining Education Through Immersive Learning: The Future of VR and AI

When framed within constructivist epistemology, the potential of virtual VR and AI to revolutionize education is profound because of the emphasis on active, experiential learning (Marougkas et al., 2024). As discussed in this research paper, VR and AI technologies offer immersive experiences that allow learners to construct knowledge through personalized, adaptive

learning environments. A very good example with proven positive results was recently created in the “Museum of Instructional Design” (Glaser et al., 2024), where “the integration of the 3D immersive environment greatly supported participants’ positive learning experiences” (p. 346). Educational technologists can now do amazing things to immerse learners like never before and push the limits of what is possible by implementing these tools in various settings, from the tourism industry in hotels and museums to enhance the experience of travel (Doborjeh et al., 2022) to nursing homes for increased physical activity within the senior population (Bermúdez et al., 2023). I have shown throughout this paper that these technologies are becoming more ubiquitous, and that we are hurtling towards the bright future for educational technologists that Tamm (2023) envisions in his TEDx talk from the beginning of this paper. When educators further the AI enhanced VR dialogue within a constructivist framework, this will help address current learning challenges and create engaging and effective solutions to various problems in higher ed, healthcare and corporate training and a myriad of capacities (Jing et al., 2024; Tusher et al., 2024).

The research in this paper demonstrates how constructivist principles align with various uses of VR and AI, showing how these tools provide learners with opportunities to practice skills in highly realistic settings. The addition of adaptive learning platforms to AI-assisted VR ensures that learning experiences are personalized to each student's needs, providing real-time feedback and promoting a deeper understanding of various topics (Gordon, 2020). While there are numerous benefits to AI assisted VR technologies, the challenges for full scale implementation cannot be overlooked. Addressing these various obstacles will require ongoing evaluation and thoughtful implementation from leaders in learning design and technology. Looking ahead, we can embrace the immersive and personalized possibilities of VR and AI within a constructivist

framework, working collectively towards a future where education becomes more engaging, effective, inclusive, and transformative.

References

Abbas, Y., Martinetti, A., Nizamis, K., Spoolder, S., & van Dongen, L. A. M. (2023). Ready, trainer ... one! Discovering the entanglement of adaptive learning with virtual reality in industrial training: A case study. *Interactive Learning Environments*, 31(6), 3698–3727. https://doi.org/10.1080/10494820.2021.1940215

Bartlett, F. C. (Frederic C. (1995). Remembering: a study in experimental and social psychology. Cambridge University Press.

Bermúdez i Badia, S. et al. (2023). Development and validation of a mixed reality exergaming platform for fitness training of older adults. In: Simeone, A., Weyers, B., Bialkova, S., Lindeman, R.W. (eds) *Everyday Virtual and Augmented Reality. Human–Computer Interaction Series.* Springer, Cham. https://doi.org/10.1007/978-3-031-05804-2_5

Dalgarno, B. and Lee, M.J.W. (2010), What are the learning affordances of 3-D virtual environments?. *British Journal of Educational Technology*, 41: 10-32. https://doi-org.ezproxy.lib.purdue.edu/10.1111/j.1467-8535.2009.01038.x

Doborjeh, Z., Hemmington, N., Doborjeh, M., & Kasabov, N. (2022). Artificial intelligence: A systematic review of methods and applications in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 34(3), 1154–1176. https://doi.org/10.1108/IJCHM-06-2021-0767

Dolata, M., & Schwabe, G. (2023). What is the Metaverse and who seeks to define it? Mapping the site of social construction. *Journal of Information Technology*, *38*(3), 239–266. https://doi.org/10.1177/02683962231159927

Dutta, S., Ranjan, S., Mishra, S., Sharma, V., Hewage, P., & Iwendi, C. (2024). Enhancing educational adaptability: A review and analysis of AI-driven adaptive learning platforms. *2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM)*, 1–5. https://doi.org/10.1109/ICIPTM59628.2024.10563448

Fowler, C. (2015). Virtual reality and learning: Where is the pedagogy? *British Journal of Educational Technology*, 46(2), 412–422. https://doi.org/10.1111/bjet.12135

Glaser, N., Yang, M., Li, S. E., & Mendoza, K. R. (2024). The museum of instructional design: An examination of learner experiences & usability in a collaborative 3D virtual learning environment. *TechTrends*, 68(2), 338–357. https://doi.org/10.1007/s11528-024-00933-6

Göbel, S., & Wendel, V. (2016). Personalization and adaptation. In R. Dörner, S. Göbel, W. Effelsberg, & J. Wiemeyer (Eds.), Serious games: Foundations, concepts and practice (pp. 161–210). Springer International Publishing.

Gordon, K. W. (2020). A conceptual design for an adaptive learning technology implementation model. *ProQuest Dissertations & Theses*.

Hu, K., Wang, R., Zhao, S., Yin, E., & Wu, H. (2024). The association between social rewards and anxiety: Links from neurophysiological analysis in virtual reality and social interaction game. *NeuroImage* (Orlando, Fla.), 299, 120846-. https://doi.org/10.1016/j.neuroimage.2024.120846

Jia, Y., Wang, X. E., Sin, Z. P. T., Li, C., Ng, P. H. F., Huang, X., Baciu, G., Cao, J., & Li, Q. (2024). Knowledge-graph-driven mind mapping for immersive collaborative learning: A pilot study in edu-metaverse. *IEEE Transactions on Learning Technologies*, *17*, 1834–1848. https://doi.org/10.1109/TLT.2024.3406638

Jing, Y., Wang, C., Chen, Z., Shen, S., & Shadiev, R. (2024). A bibliometric analysis of studies on technology-supported learning environments: Hot topics and frontier evolution. *Journal of Computer Assisted Learning*, 40(3), 1185–1200. https://doi.org/10.1111/jcal.12934

Marougkas, A., Troussas, C., Krouska, A., & Sgouropoulou, C. (2024). How personalized and effective is immersive virtual reality in education? A systematic literature review for the last decade. *Multimedia Tools and Applications*, 83(6), 18185–18233. https://doi.org/10.1007/s11042-023-15986-7

Mursion. (2023, May 8). Empathetic leadership helps solve the human-skills shortage: *Mursion*. Virtual Reality Training Simulation Software by Mursion. https://www.mursion.com/blog/empathetic-leadership-human-skills-shortage/

Peterson, E., Bogosian, B., Tubella, J., & Vassigh, S. (n.d.). Teaching robotics with virtual reality: Developing curriculum for the 21st century workforce. In: *Advances in Human Factors in Training, Education, and Learning Sciences* (pp. 12–18). Springer International Publishing. https://doi.org/10.1007/978-3-030-80000-0_2

Saeed, A., Ali, A., & Ashfaq, S. (2024). Employees' training experience in a metaverse environment? Feedback analysis using structural topic modeling. *Technological*

Forecasting & Social Change, *208*, 123636-. https://doi.org/10.1016/j.techfore.2024.123636

Salinas-Navarro, D. E., Vilalta-Perdomo, E., Michel-Villarreal, R., & Montesinos, L. (2024). Using generative artificial intelligence tools to explain and enhance experiential learning for authentic assessment. *Education Sciences*, 14(1), 83-. https://doi.org/10.3390/educsci14010083

Schunk, D. H. (2020). Learning Theories: An Educational Perspective (8th ed.)

Sidhu, M. S., Mousakhani, S., Lee, C. K., & Sidhu, K. K. (2024). Educational impact of metaverse learning environment for engineering mechanics dynamics. *Computer Applications in Engineering Education*, *32*(5). https://doi.org/10.1002/cae.22772

Sin, Z. P. T., Jia, Y., Wu, A. C. H., Zhao, I. D., Li, R. C., Ng, P. H. F., Huang, X., Baciu, G., Cao, J., & Li, Q. (2023). Towards an edu-metaverse of knowledge: Immersive exploration of university courses. *IEEE Transactions on Learning Technologies*, 1–14. https://doi.org/10.1109/TLT.2023.3290814

Song, C., Shin, S.-Y., & Shin, K.-S. (2023). Optimizing foreign language learning in virtual reality: A comprehensive theoretical framework based on constructivism and cognitive load theory (VR-CCL). Applied Sciences, 13(23), 12557-. https://doi.org/10.3390/app132312557

Strivr. (2024, March). Forbes lists Strivr among America's best startup employers in 2024. *Strivr Blog*. https://www.strivr.com/blog/forbes-recognized-strivr-americas-best-startup-employers-2024

Tamm, K. (2023, September 11). VR and AI in education: The future of learning | Kristen Tamm | TEDxTartuED. YouTube. https://www.youtube.com/watch?v=XGkWh4v1hCE

Tusher, H. M., Mallam, S., & Nazir, S. (2024). A Systematic review of virtual reality features for skill training. *Technology, Knowledge and Learning*, 29(2), 843–878. https://doi.org/10.1007/s10758-023-09713-2

Wang, P., Wu, P., Wang, J., Chi, H.-L., & Wang, X. (2018). A critical review of the use of virtual reality in construction engineering education and training. *International Journal of Environmental Research and Public Health*, 15(6), 1204-. https://doi.org/10.3390/ijerph15061204

Zhou, Q., Wang, B., & Mayer, I. (2024). Understanding the social construction of the metaverse with Q methodology. *Technological Forecasting & Social Change*, *208*, 123716-. https://doi.org/10.1016/j.techfore.2024.123716

Requirements	Points Explanation				Points Earned/Available
	Exceeds Standard	Meets Standard	Needs Improvement	Unacceptable	Points
	9-10	7-8	5-6	0-4	
Context	The student clearly identifies their target audience and context, and all language and terms are appropriate for that context	The student clearly identifies their target audience and context, and most language and terms are appropriate for that context	The student identifies their target audience and context, but more detail is needed, or the language and terms are vague or general	The student does not identify their target audience and context, or the language and terms used are inappropriate or incorrect	/10

Introduction	The introduction is well-written and engaging, and introduces the reader to the learning theory and argument in an entertaining or memorable way	The introduction is well-written, and introduces the reader to the learning theory and argument in an acceptable way	The introduction is poorly written, does not introduce the reader to the learning theory or argument in a comprehensible way, or is not fully developed	The introduction is missing, does not set the reader up to understand the learning theory and argument, or is excessively confusing	/10
Argument	The argument is original, timely, and relevant, it is intellectually rigorous while being appropriate to the length of this paper, and clearly stated in a way that flows with the text	The argument is original, timely, or relevant, it is intellectually challenging while being appropriate to the length of this paper, and stated in a way that generally flows with the text	The argument is interesting, but may not be original or relevant. It may be somewhat superficial, or it does not flow well with the text.	The argument is missing entirely, is not relevant to the content in this course, or is not situated appropriately within the structure of the paper	/10
Conclusion	The conclusion clearly indicates why this topic is important for the author's context, connects to the ideas in the introduction, and is engaging and satisfying. There are no lingering questions about the argument.	The conclusion indicates why this topic is important for the author's context, loosely connects to the ideas in the introduction, and wraps up the argument. There may be 1-2 minor lingering questions.	The conclusion is poorly developed, does not directly connect to the author's context, is not connected to the introduction, or leaves more than 3 lingering questions.	The conclusion is missing, there is no context related to the author, or does not adequately summarize the arguments and content in the paper.	/10
Research and Conventions	Sources are from reputable places, are correctly cited, and the minimum number	Sources are from reputable places, are cited with 1-2 minor errors,	Sources may not be from reputable places, there may be more	Sources are not reputable, there were consistent errors in citation, there	/10

	of citations was included. There are no spelling or formatting errors	and the minimum number of citations was included. There are a few minor spelling or formatting errors	than occasional errors, or the student missed 1-2 of the required number of citations. There are several spelling or formatting errors that are occasionally distracting	was evidence of plagiarism, or the student was missing more than 3 of the required number of citations. There are multiple distracting spelling or formatting errors	
Comments					
Total					/50