



## Extended Abstract—Immersive Virtual Reality Experiences as a Means to Enhance Character Development: Development of a University Course

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**Abstract.** Our work in progress brings together an interdisciplinary university-based project team to develop and evaluate a character education course that infuses fully-immersive virtual reality (VR) experiences and aligns with the general education curriculum. Virtual reality enables expansive, immersive, autonomous, and embodied learning, and has demonstrated promise in inducing empathy, prosocial behavior, and gratitude. We prioritize ten key character strengths across three topical modules (aging, technology in society, neurodiversity). Students will experience VR in a Dreamscape Learn environment, a fully immersive technology that enables several students to physically interact in a 3D environment which can be seen and heard through a VR headset. The program is developed via Relational Systems Evaluation, and the full project will result in the delivery of the character education course, instructor’s manual, and three virtual reality experiences. Our working groups include teams focused on (1) the virtual reality experiences which include faculty and students with expertise in computer science, game design, VR/XR, animation and VFX, screenwriting, directing and narrative design; (2) the three content areas (as well as character broadly), including faculty, staff, students, and community members; (3) curriculum design and course delivery modalities; and (4) evaluation.

**Keywords:** Virtual Reality, Character Education, University Classroom.

### 1 Introduction

This work in progress brings together an interdisciplinary project team of faculty and staff at a large public university in the United States of America to develop and evaluate a character education course that infuses fully-immersive virtual reality experiences and meets the character-focused learning objectives (e.g., humility, empathy, open-mindedness) set forth in our general education curriculum. To date, there has been minimal research on the use of virtual reality in the context of character education, yet “VR has the potential to contribute positively and significantly to the current character education movement” [1, p. 234]. This first-of-its-kind project has the potential to reach the entire undergraduate population of 18,000 students at our university and, if successful, to be shared with other educational institutions interested in using virtual reality to enhance character education.

### 2 Immersive Learning in Service of Humanity

Now more than ever, universities must not only prepare students for careers but also to be engaged citizens of the world who can think critically and creatively, communicate clearly, and act ethically with passion and purpose in service of humanity. The general education curriculum required of all undergraduate students is one mechanism for ensuring all students receive a well-rounded holistic higher education experience. Our university’s core curriculum has recently been reimagined with a focus on aligning courses to a character focused mission organized around five values that form the acronym – SEEDS:

- (1) **Social Justice and Equity.** Students will learn how different forms of inequality (social, economic, environmental, racial, gender) have developed; the history of those who have struggled against injustice; and the many ways in which inequality continues to function in present day society.

- (2) **Educated Citizenry.** Students will learn to assess, produce, and communicate knowledge as informed and responsible citizens, and learn to critically evaluate the sociopolitical structures that influence information creation.
- (3) **Engagement, Agency and Leadership.** Students will learn how to engage with issues in their communities and develop the confidence and strategies to become leaders and contribute to the public good.
- (4) **Diversity and Intercultural Competency.** Students will develop the ability to understand diverse cultural contexts and to communicate and function within them.
- (5) **Self-discovery and Self-Care.** Students will be introduced to multiple disciplinary approaches towards achieving a healthy, meaningful, and productive life, and, along the way, develop a sense of self.

SEEDS is a response to the call for universities to elevate their obligation to educate for character.

The project team conducted a preliminary study to understand what character strengths and values are particularly important to our undergraduate students. The findings from the study combined with the tenets of the SEEDS curriculum and the mission and vision of the university led to the prioritization of the following ten character strengths which will be highlighted in the course: curiosity, empathy, creativity, open-mindedness, self-awareness, collaboration, humility, purposefulness, interconnection, and accountability.

## 2.1 Why Use Virtual Reality for Character Education?

Our character education course is designed to produce durable character development outcomes by engaging students in sustained, effortful, emotionally meaningful, and coherently integrated experiences where VR is used as an intentional learning tool as opposed to a novelty or motivational add-on. When embedded within a semester-long course, intentionally designed to provide coherence, sequencing, and integration, VR is uniquely suited to deliver the specific learning conditions that cognitive, motivational, and developmental science identify as necessary for sustained outcomes. Decades of education research show durable change emerges when an intervention is: 1) intense (i.e., deliberate effortful practice and productive struggle) [2–5], 2) sustained (i.e., time for consolidation and reconceptualization) [6–10], 3) engaging (i.e., fun, emotionally meaningful, motivational architecture) [11–14], and 4) integrated (i.e., coherently sequenced practice that explicitly scaffolds integration) [15–18].

Virtual reality experiences can uniquely *intensify* learners' experience and *engagement* through immersion, presence, interactivity, and embodiment. For example, highly immersive VR experiences can improve learning outcomes, intrinsic motivation, self-efficacy, and positive emotions [19]. A study that used EEG to record brain activity found evidence that persistent engagement in value practices can reshape and modify the brain [20]. Another study used a gamified VR experience to enhance interpersonal connectedness in the context of a higher education course [21]. At the elementary school level, VR-based morality education has been seen to improve children's sensitivity to moral situations but not necessarily result in greater rates of judgment [22]. Perspective-taking research provides evidence that VR experiences can increase prosocial behavior toward others [23].

Although there is a dearth of research on how virtual reality (VR) can be used to enhance character, "the time is right to explore... what contribution VR might make to character education" [1, p. 220]. The EPIC Framework draws from theories of moral development, ethical decision-making, and learning theories to articulate how immersive, gamified, social educational experiences can promote moral development [24]. Specifically, virtual reality enables expansive, immersive, autonomous, and embodied learning [1]. VR allows students to enter contexts that would otherwise not be available to them (expansive learning). By assuming the physical identity of a character, students can experience the world dynamically through the body of someone completely unlike themselves (embodied learning). Social situations and dilemmas can be manufactured by immersing students in simulated environments (immersive learning). Self-directed learning and autonomous virtuous reasoning are also promoted in virtual reality where students are encouraged to critically engage with character constructs (autonomous learning).

In isolated studies, VR has already demonstrated promise in inducing empathy [25–27], prosocial behavior [28–29], and gratitude [30]. In addition to cultivating virtue through immersive experiences, students will engage in reflective practices, exemplar modeling, dialogues, situational awareness, reminders, and peer support networks [31]. The semester-long course will create impactful learning activities that blend VR technology with research-backed approaches to character education.

The authors are also well-aware of the potential dangers of utilizing VR technology to shape the character and virtues of students, even if the intent is well-meaning. The immersive and perspective-inducing aspects of VR are potent tools that should be used thoughtfully and with care. Ethical XR design frameworks, such as E3XR [32], provide a reflective lens that developers and designers can utilize to prevent unwanted experiences for their users. By implementing practical steps to protect users (i.e., preserving privacy, autonomy, consent, etc.), designers can ensure they continue to move towards "eudaimonia," or fulfilling their full potential [32, p. 10]. Other explorations

of ethics in VR have also illuminated areas where the realism and immersion of VR experiences can be detrimental to user emotion and behavior [33]. For this project, efforts were made to understand the potential pitfalls and our responsibilities to create fair and ethical experiences for the students.

## 2.2 VR Technology & Intervention Design

Our university partnered with Dreamscape Learn (DSL) whose mission is to merge the most advanced experiential pedagogy with the entertainment industry’s best cinematic storytelling to deliver unique virtual reality education experiences that change the game, at large scale, in how students and faculty work and in the student outcomes that result from that work. DSL’s platform is a fully immersive technology that enables several students to physically interact in a 3D environment which can be seen and heard through a VR headset. Our project uses a two-pod configuration of the DSL platform where six students simultaneously interact in the virtual space. In order to maximize potential use and dissemination, the VR experiences are built in Unity and can be used with just a VR headset. As is standard in DSL installations, finger-less hand-tracking is used and various haptic interactions can be employed (e.g., floor vibrations, wind blowing, etc.). The fully immersive experience, requires deployment in a DSL pod. As of January 2025, in addition to Arizona State University where the technology was pioneered, thirteen additional institutions have adopted DSL’s technology with plans for expansion.

This project’s VR interventions are designed to merge storytelling and interaction to create a compelling immersive learning experience. Our efforts are similar to recognized progressions in storytelling when new media are introduced [34]. Adapting traditional storytelling methods to the VR medium, we positioned the users to have a 3<sup>rd</sup>-person perspective but conduct 1<sup>st</sup>-person actions through interactive games (e.g., solving a puzzle to remember a name). In the experience on aging, users are introduced to the story of an elderly woman trying to renew her driver’s license at the Department of Motor Vehicles. To prevent users from simply feeling pity for her, users are teleported to key moments in her life and have interactions designed to share the depth of her life experiences. Multiplayer functionality is also implemented to allow students to have a collaborative learning experience upon which they can build social skills, positive interdependence, and other group behaviors [35]. All the embedded games require teamwork to complete, enhancing the shared experience.

## 2.3 Course Overview

This semester long course is divided into four modules. The first module introduces character from multiple disciplinary perspectives. The following three modules explore character through the lens of a broader topic (aging, technology in society, and neurodiversity). Each of these three topical modules include a VR experience. The topical modules are each divided into three sections: 1) topic overview, 2) virtual reality experience, 3) action planning. Fig. 1 provides an overview of the course structure.

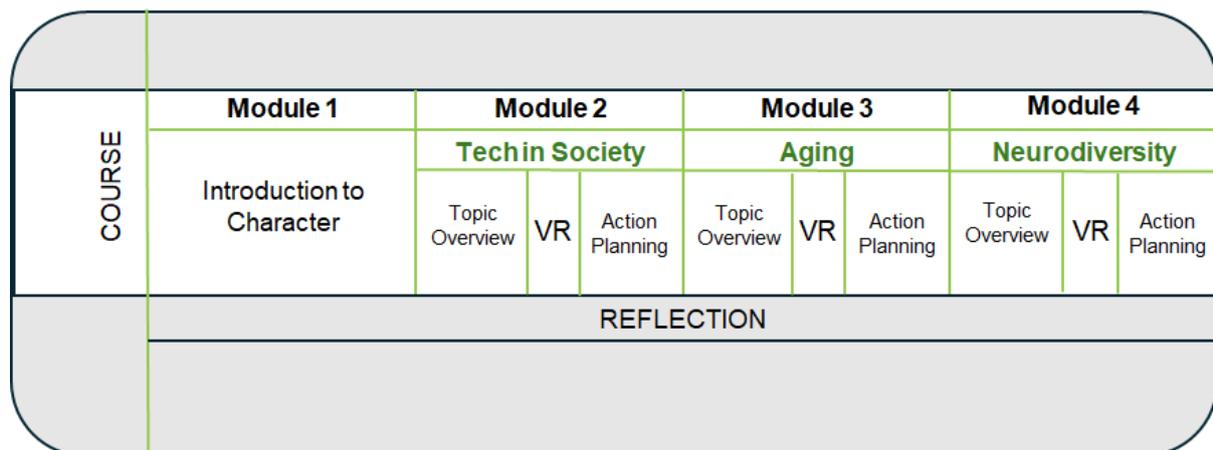


Fig. 1. VR character Development course structure.

## 3 Rigorous Research, Innovative Practice

Our iterative design process is grounded in Relational Systems Evaluation (RSE) [36]—an approach to program planning that includes the development of a visual theory of change (pathway model) which enables backwards design. A pathway model is a particular type of diagram that illustrates the theoretical connections between a set

of activities and their intended outcomes and has two basic parts: nodes and arrows [37]. The nodes represent either activities or outcomes. The arrows represent the assumed causal relationships between the boxes. Our pathway model articulates the connections between the specific activities students in our character education course will complete (e.g., reflection activities, critical analysis, VR experiences) and the specific changes related to character we believe participants in the course will experience (e.g., increased empathy, critical reasoning, humility). Fig. 2 presents the pathway model for module two which focuses on exploring character through the lens of aging including how we believe the VR experience will enhance character development. The pathway model was built by an interdisciplinary group of faculty and community members through a facilitated process grounded in RSE. The pathway model grounds all decision-making as we design the course and the accompanying VR experiences.

We are iteratively testing both the real world and virtual reality components of the course through an ongoing quality improvement process evaluation. According to RSE, evaluative rigor is achieved when the evaluation method matches the programmatic lifecycle phase [38]. Since our course is still being designed and the program has not yet reached Phase 1–Initiation, the appropriate focus of evaluation should be on course functionality (e.g., VR components work as intended, course activities meet design goals) and should not yet measure student outcomes.

We are currently engaging in iterative student testing of the aging VR experience. Small groups of students do the VR experience (~15 minutes) followed by a semi-structured focus group where they are asked about their experience with the VR across three dimensions: Technical, Emotional/Story, and Aesthetic. Technical questions aim to assess whether the operations and experience of gameplay run smoothly. Emotional/story related questions assess engagement, relatability, connection to the storyline, and identification of target character constructs (e.g., purpose and interconnection) in the narrative. Aesthetic questions assess whether the visuals, sounds, animation, and characters are aesthetically pleasing.

Our process evaluation approach is flexible, adaptive, responsive, and provides rapid feedback to our technical, creative, pedagogical, and character development experts so they can adjust throughout the course design process. Once the course is designed and the VR experiences are completed, we anticipate offering the course to students in fall 2027. At that point, the course will be in Phase 1–Initiation and we will conduct a corresponding Phase 1–Process and Response evaluation [38]. Additional information is available about RSE including how it has been used for program design, building consensus within a large interdisciplinary team, and for evaluation planning [36–37, 39].

## **4 Collaboration that Transcends Disciplinary Silos**

This project can only be accomplished by working in deep collaboration across traditional disciplinary silos. For the first six months of the project, the core project team (which is comprised of faculty and staff at the university) met regularly and took turns leading the session. Each week, one member assigned the rest of the team readings, videos, or games to play in order to introduce others to their discipline/area of expertise. Over time, we added additional “working groups” as we recognized a need for various kinds of expertise.

Our working groups include the team developing the virtual reality experiences which include faculty and students with expertise in computer science, game design, VR/XR, animation and VFX, screenwriting, directing and narrative design. We have working groups for each of our content areas (as well as character broadly) which include faculty, students, and community members with academic knowledge and lived experience related to the content areas (aging, technology in society, neurodiversity). Experts in these areas come from across the university including from philosophy, religion, justice studies, English, audiology, business, family science and human development, gerontology, psychology, hospitality and tourism. We have a working group focused on curriculum design and course delivery modalities comprised of experts in instructional design, educational technology, curriculum development, and digital media design. Finally, we have a dedicated evaluation team.

## **5 Limitations**

Limitations of the project reside in our relative unfamiliarity with the DSL technology and that construction will not be completed until summer 2026. While the project team has adequate amounts of experience with VR and other learning technologies, DSL is a fairly closed system and we cannot truly know how implementation of the intervention will progress until the actual hardware is ready. Currently, testing is occurring with the DSL Software Development Kit, the version of Unity it supports (2022.3.54f), and the headsets that will be used in the DSL pods (*Vive Focus 3*). Related to this, procedural issues may arise due to class scheduling, hardware and software

preparation, and other curriculum-related items. We are in contact with other institutions with DSL installations to gain as much information as possible on logistical matters but will inevitably have to address them as they arise in our specific situation. It is possible that these circumstances may limit the effectiveness of the VR intervention, course, and its generalizability to other contexts.

## 6 Expected Outcomes

We have completed the first year and a half of a three-year grant funded by the Lilly Endowment and Wake Forest University's Educating Character Initiative. Our project will result in the delivery of the following specific outcomes: a character education course, instructor's manual, and three virtual reality experiences. The course will be implemented for the first time in fall 2027. Funding will be sought to continue testing and refining the course and the associated VR experiences during the first year of implementation. In the future, we plan on applying the RSE approach to iteratively assess the outcomes in the pathway model. Within our university, our collaborative project is being examined to determine future approaches to integrating VR, DSL, and curricular efforts. If successful, this course has the potential to scale not only to other universities that use the DSL platform, but also to universities with access to VR headsets and a commitment to using innovative methods such as VR to engage in thoughtful character initiatives on their campuses.

## 7 Conclusion

Our innovative project has important implications for strengthening delivery of character education in engaging and effective ways. The development of the course, VR experiences, and accompanying instructor's manual can serve as a model for others interested in merging character development with VR or other immersive technologies. Our presentation will highlight how Relational Systems Evaluation provided a theoretically grounded framework that situated our course within an ecological context while integrating diverse expertise through collaborative partnerships. Our presentation will also highlight the challenging aspects of interdisciplinary, cross-departmental collaboration and how we situated different viewpoints as assets in order to develop the VR experiences. Specifically, we will describe the ongoing process of developing the VR experiences taking advantage of an academically-diverse project team, with specific attention to how team members merged their diverse perspectives. Our presentation will also highlight findings to date from our process evaluation.

## Acknowledgments

This publication was made possible through the support of a grant from Wake Forest University and Lilly Endowment Inc. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of Wake Forest University or Lilly Endowment Inc.

## References

1. Harrison, T.: Virtual reality and character education: Learning opportunities and risks. *Journal of Moral Education* 53(2), 219-239 (2024).
2. Bjork, R.A., Bjork, E.L.: Making things hard on yourself, but in a good way: Creating desirable difficulties to enhance learning. In: Gernsbacher, M.A., Pew, R.W., Hough, L.M., Pomerantz, J.R. (eds.) *Psychology and the Real World: Essays Illustrating Fundamental Contributions to Society*, pp. 56–64. Worth Publishers, New York (2011).
3. Ericsson, K.A., Krampe, R.T., Tesch-Römer, C.: The role of deliberate practice in the acquisition of expert performance. *Psychol. Rev.* 100(3), 363–406 (1993).
4. Hattie, J.: *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Routledge, London (2009).
5. Sweller, J., Ayres, P., Kalyuga, S.: *Cognitive Load Theory*. Springer, New York (2011).
6. Cepeda, N.J., Pashler, H., Vul, E., Wixted, J.T., Rohrer, D.: Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychol. Bull.* 132(3), 354–380 (2006).
7. Cepeda, N.J., Pashler, H., Vul, E., Wixted, J.T., Rohrer, D.: Spacing effects in learning: A temporal ridgeline of optimal retention. *Psychol. Sci.* 20(9), 1095–1102 (2009).
8. Roediger, H.L., Karpicke, J.D.: Test-enhanced learning: Taking memory tests improves long-term retention. *Psychol. Sci.* 17(3), 249–255 (2006).

9. Immordino-Yang, M.H., Damasio, A.: We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind Brain Educ.* 1(1), 3–10 (2007).
10. Oyserman, D.: Pathways to success through identity-based motivation. In: *Oxford Handbook of Human Motivation*. Oxford University Press, Oxford (2015).
11. Ryan, R.M., Deci, E.L.: Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemp. Educ. Psychol.* 25(1), 54–67 (2000).
12. Ryan, R.M., Deci, E.L.: *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. Guilford Press, New York (2017).
13. Csikszentmihalyi, M.: *Flow: The Psychology of Optimal Experience*. Harper & Row, New York (1990).
14. Immordino-Yang, M.H., Darling-Hammond, L., Krone, C.: *The Brain Basis for Integrated Social, Emotional, and Academic Development*. Aspen Institute, Washington, DC (2019).
15. Bransford, J.D., Brown, A.L., Cocking, R.R. (eds.): *How People Learn: Brain, Mind, Experience, and School*. National Academy Press, Washington, DC (2000).
16. Perkins, D.: *Smart Schools: From Training Memories to Educating Minds*. Free Press, New York (1992).
17. Chi, M.T.H., de Leeuw, N., Chiu, M.H., LaVancher, C.: Eliciting self-explanations improves understanding. *Cogn. Sci.* 18(3), 439–477 (1994).
18. Zimmerman, B.J.: Becoming a self-regulated learner: An overview. *Theory Pract.* 41(2), 64–70 (2002).
19. Yu, N., Shi, W., Dong, W., Kang, R.: The impact of virtual reality immersion on learning outcomes: A comparative study of declarative and procedural knowledge acquisition. *Behav. Sci. (Basel)* 15(10), 1322 (2025).
20. Kim, M.: Embodied values: pedagogical insights from developmental neuroscience. In Lovat, T., Toomey, R., Clement, N., Dally, K. (eds.) *Second International Research Handbook on Values Education and Student Wellbeing*, pp. 175-189. Springer, New York, NY (2023).
21. Ehab, A., Burnett, G., Sung, K.J.: Escaping the maze: Enhancing teamwork and collaboration in higher education through a gamified virtual reality experience. In: Krüger, J.M., et al. *Immersive Learning Research Network. iLRN 2025. Communications in Computer and Information Science*, vol 2598. Springer, Cham. (2025).
22. Shim, J.: Investigating the effectiveness of introducing virtual reality to elementary school students' moral education. *Computers and Education: X Reality* 2, 100010 (2023).
23. van Loon, A., Bailenson, J., Zaki, J., Bostick, J., Willer, R.: Virtual reality perspective-taking increases cognitive empathy for specific others. *PLOS One* 13(8), e0202442 (2018).
24. Schrier, K.: EPIC: A framework for using video games in ethics education. *J. Moral Educ.* 44(4), 393–424 (2015).
25. Bertrand, P., Guegan, J., Robieux, L., McCall, C.A., Zenasni, F.: Learning empathy through virtual reality: Multiple strategies for training empathy-related abilities using body ownership illusions in embodied virtual reality. *Frontiers in Robotics and AI* 5, 26 (2018).
26. Ingram, K., Espelage, D., Merrin, G., Valido, A., Heinhorst, I., Joyce, M.: Evaluation of a virtual reality enhanced bullying prevention curriculum pilot trial. *Journal of Adolescence* 71(1), 72-84 (2019).
27. Kalyanarama, S.S., Penn, D.L., Ivory, J.D., Judge, A.: The virtual doppelganger: Effects of a virtual reality simulator on perceptions of schizophrenia. *Journal of Nervous & Mental Disease* 198(6), 437-443 (2010).
28. van Loon, A., Bailenson, J., Zaki, J., Bostick, J., Willer, R., Lamm, C.: Virtual reality perspective-taking increases cognitive empathy for specific others. *PLoS ONE* 13(8), e0202442 (2018).
29. Yoo, H., Feng, X., Day, D.: Adolescents' empathy and prosocial behavior in the family context: A longitudinal study. *Journal of Youth and Adolescence* 42(12), 1858-1872 (2013).
30. Collange, J., Guegan, J.: Using virtual reality to induce gratitude through virtual social interaction. *Computers in Human Behavior* 113, 106473 (2020).
31. Lamb, M., Brandt, J., Brooks, E.: How is virtue cultivated? Seven strategies for postgraduate character development. *Journal of Character Education* 17(1) 81-108 (2021).
32. Lee, J.J., Hu-Au, E.: E3XR: An analytical framework for ethical, educational and eudaimonic XR design. *Frontiers in Virtual Reality* 2, 135 (2021).
33. Slater, M., Gonzalez-Liencre, C., Haggard, P., Vinkers, C., Gregory-Clarke, R., Jelley, S., Watson, Z., Breen, G., Schwarz, R., Steptoe, W., Szostak, D., Halan, S., Fox, D., Silver, J.: The ethics of realism in virtual and augmented reality. *Frontiers in Virtual Reality* 1, 1–13 (2020).
34. Zhou, B.: *Storytelling in extended reality (XR) for spatial experiences: What are the best practices and relevant strategies for using augmented reality (AR) in exhibitions*. Master's thesis, SRH Hochschule der Popularen Kunste (2020).
35. Wendel, V., Gutjahr, M., Göbel, S., Steinmetz, R.: Designing collaborative multiplayer serious games: Escape from Wilson Island-A multiplayer 3D serious game for collaborative learning in teams. *Education and Information Technologies* 18(2), 287–308 (2013).
36. Urban, J.B., Archibald, T., Hargraves, M., Buckley, J., Hebbard, C., Linver, M. R., Trochim, W. M.: Introduction to Relational Systems Evaluation. *New Directions for Evaluation* 2021(169), 11-18 (2021).
37. Urban, J.B., Hargraves, M., Buckley, J., Archibald, T., Hebbard, C., Trochim, W. M.: The Systems Evaluation Protocol for evaluation planning. *New Directions for Evaluation* 2021(169), 31-45 (2021).
38. Urban, J.B., Hargraves, M., Trochim, W.M.: Evolutionary evaluation: Implications for evaluators, researchers, practitioners, funders and the evidence-based program mandate. *Eval. Program Plann.* 45, 127–139 (2014).
39. Chauveron, L., Samtani, S., Groner, M., Urban, J.B., Linver, M.R.: Including diverse stakeholder voices in youth character program evaluation. *Am. J. Eval.* 42(2), 221–236 (2021).

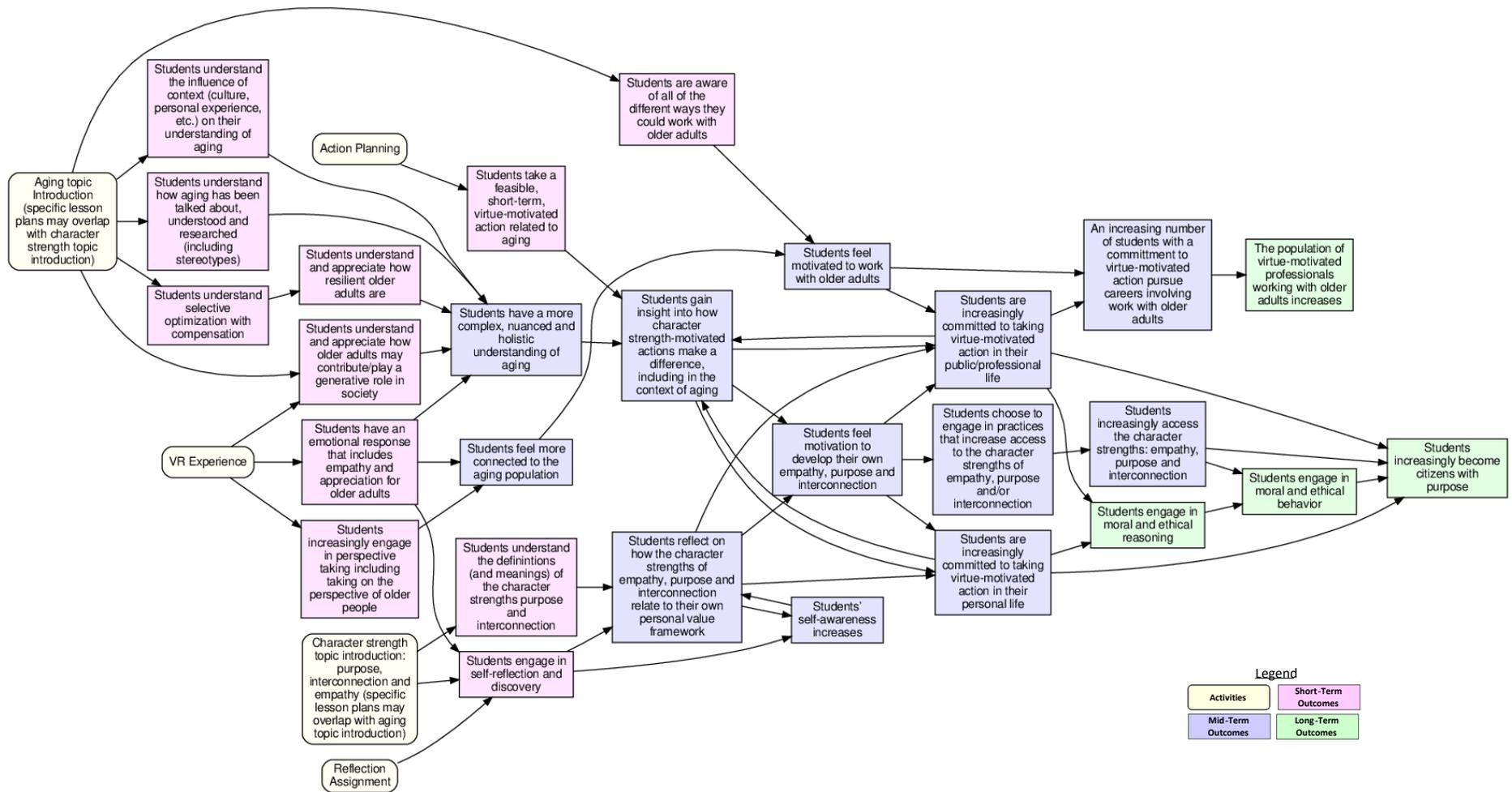


Fig. 2. VR character development course Pathway Model for Aging Module (Module 2).