Augmenting Gender Equality in Education through Digital Twin Technologies

Manjola Zeneli†
Information Technology
Aleksander Moisiu University
Durres Albania
manjolazeneli2@yahoo.com

ABSTRACT
In the field of education, gender differences in enrolment, retention, and attainment rates continue to be a major challenge to gender equality. The potential of digital twin technologies to support efforts to achieve gender equality in education is examined in this study. Digital twins provide options for modeling, analyzing, and optimizing learning environments since they are virtual copies of actual systems or processes. This study analyzes the body of research on gender differences in education, looks at the potential applications of digital twin technology, and suggests ways to use digital twins to advance gender equality in the classroom. Examples of effective implementations and case studies are given to show how digital twins could improve gender inclusion in education. Furthermore, the ethical ramifications, potential biases, and data privacy are examined to guarantee the appropriate and fair implementation of digital twin solutions. There is also highlighted how digital twin technologies can be revolutionary instruments for promoting gender equality and creating inclusive learning environments.

CCS CONCEPTS
• Human-centered computing • Social and professional topics
• Applied computing

KEYWORDS
Gender Equality, Education, Digital Twins, Data Analytics, Personalized Learning, Inclusive Design, Technology, Simulation, Inclusivity, Data Privacy, Ethics

1 Introduction and Applications of Digital Twins in Education

Digital twin frameworks that incorporate gender-sensitive data analytics, tailored learning strategies, and inclusive design principles enable educators to better understand gender-specific issues and provide interventions that are specifically designed to address them through strategies. The crucial applications of digital twins in education are detailed below:

• Experimentation and Simulation
• Personalized Learning
• Collaborative Learning
• Distant Learning
• Understanding complicated

2 Case studies and methodology

To understand better the functions and the benefits of the digital twins’ technologies is of great interest to analyze concrete environments of implementations as are detailed below:

• Virtual Labs: Digital twins are being used by universities to build virtual laboratories for students studying biology, chemistry, physics, electronics and more. Students can conduct experiments, evaluate data, and make conclusions in a risk-free setting with these virtual labs.
• Medical Simulation: Students can practice surgical methods, diagnose ailments, and hone clinical skills by using digital twins to replicate medical operations and scenarios in medical universities.
• Engineering Design: Digital twins are being included into design classes by engineering programs, allowing students to optimize their ideas prior to prototyping by simulating the behavior of mechanical, electrical, and civil systems.

Below there is a detailed workflow for creating the virtual lab with digital twins on gender equality with all the necessary procedures from need analysis on the real rates for gender equality, focus groups with students and educators to understand barriers to gender equality, Identify specific areas where gender disparities are most pronounced and where digital twins can have the most impact, the crafting of the courses, curricula’s to be integrated with virtual labs, deepen the knowledge on theoretical part of digital twins and hands on practice developments. Elaborating and evaluating the results and considering the feedback for future improvements on
organizational and operational aspects and thinking on establishing strategies to expand gender equality initiatives.

- Academic Performance: Improved overall academic performance due to interactive and practical learning experiences.
- Gender Equality: Greater gender equality in STEM fields through targeted initiatives and inclusive educational practices.
- Industry Preparedness: Graduates equipped with cutting-edge skills and knowledge, making them highly sought after in their respective fields.
- Innovative Thinking: Fostering a culture of innovation and critical thinking by allowing students to experiment and learn in advanced, simulated environments.

4 Conclusions

As a conclusion the usage of the digital twin technologies will bring for sure more data on the usage rate related to the gender variable, will help to have a clear panorama on gender equality rates and students’ behavior about the existing situation.

As a second conclusion would be of great interest to raise strategies based on the results from the virtual labs that can improve gender quality rates in the future.

The higher education institutions that implement these applications would be competitive and coherent to the latest developments of technology and society including innovation and gender quality.

ACKNOWLEDGMENTS

To ACM for supporting for two times my presence at Women Encourage Conferences.

REFERENCES