
Postgraduate Certificate in EdTech and AI in Education

Research Methods in EdTech

Research methods in EdTech involve a range of techniques and approaches to investigate the impact and effectiveness of educational technology in learning environments. A key concept in EdTech research is validity, which refers to the extent to which a research study accurately measures what it is intended to measure. This can be affected by various factors, including the research design, data collection methods, and sampling strategy. For instance, a study examining the effectiveness of a new learning management system may use a quasi-experimental design, where a control group and treatment group are compared to determine the impact of the system on student outcomes.

Another important concept in EdTech research is reliability, which refers to the consistency of research findings across different studies or measurements. This can be particularly challenging in EdTech research, where the rapid pace of technological change can make it difficult to replicate studies or generalize findings to different contexts. For example, a study on the use of mobile devices in the classroom may find that students who use mobile devices to access educational resources show improved learning outcomes, but the findings may not be generalizable to other contexts or populations.

EdTech research often involves the use of quantitative methods, such as surveys, experiments, and statistical analysis, to investigate the impact of educational technology on learning outcomes. However, qualitative methods, such as interviews, observations, and case studies, can also provide valuable insights into the ways in which technology is used in educational settings. For instance, a study on the use of virtual reality in education may use a mixed-methods approach, combining both quantitative and qualitative data to provide a comprehensive understanding of the technology's impact on student learning.

The use of big data and learning analytics is also becoming increasingly important in EdTech research, as it allows researchers to analyze large datasets and identify patterns and trends in student behavior and learning outcomes. For example, a study on the use of learning management systems may use data mining techniques to identify factors that predict student success or identify areas where students may be struggling. However, the use of big data and learning analytics also raises important ethical considerations, such as issues related to student privacy and the potential for bias in algorithmic decision-making.

EdTech research often involves the use of experimental designs, where a treatment group and control group are compared to determine the impact of a particular intervention or technology. However, quasi-experimental designs, where a control group and treatment group are compared but not randomly assigned, can also provide valuable insights into the effectiveness of EdTech interventions. For instance, a study on the use of online tutoring may use a pre-post design, where students' learning outcomes are measured before and after the intervention, to determine the impact of the tutoring on student learning.

The use of survey research is also common in EdTech, where researchers may use online or paper-based surveys to collect data on students' attitudes, perceptions, or behaviors related to educational technology. For example, a study on the use of social media in education may use a Likert scale to measure students'

perceptions of the effectiveness of social media as a learning tool. However, survey research can be limited by issues related to response rate and response bias, where certain groups of students may be more or less likely to respond to the survey.

EdTech research often involves the use of case study methods, where an in-depth examination of a single case or a small number of cases is used to provide a detailed understanding of the context and the impact of educational technology. For instance, a study on the use of mobile devices in a single classroom may use a case study approach to examine the ways in which the teacher and students use the devices to support learning. However, case study research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

The use of content analysis is also common in EdTech research, where researchers may analyze the content of online or offline educational materials to examine the ways in which they support or hinder student learning. For example, a study on the use of online educational resources may use a content analysis approach to examine the ways in which the resources align with learning objectives and support student engagement. However, content analysis can be limited by issues related to subjectivity, where the researcher's own biases or perspectives may influence the analysis.

EdTech research often involves the use of action research methods, where the researcher is also a practitioner or educator, and the research is used to inform and improve practice. For instance, a study on the use of educational technology in a single school may use an action research approach, where the researcher works with teachers and students to design and implement a new technology-based intervention, and then evaluates its effectiveness. However, action research can be limited by issues related to objectivity, where the researcher's own role as a practitioner may influence the research design or findings.

The use of design-based research is also becoming increasingly important in EdTech, where researchers work with educators and designers to develop and test new educational technologies or interventions. For example, a study on the use of educational video games may use a design-based approach, where the researcher works with game designers and educators to develop a new game, and then tests its effectiveness in a real-world setting. However, design-based research can be limited by issues related to scalability, where the findings may not be applicable to larger or more diverse contexts.

EdTech research often involves the use of evaluative methods, where the effectiveness of an educational technology or intervention is evaluated in terms of its impact on student learning outcomes. For instance, a study on the use of online courses may use an evaluative approach, where the researcher examines the impact of the course on student learning outcomes, and identifies areas for improvement. However, evaluative research can be limited by issues related to context, where the findings may be influenced by factors such as the educational setting, the teacher, or the students.

The use of predictive analytics is also becoming increasingly important in EdTech research, where researchers use statistical models and machine learning algorithms to predict student learning outcomes or identify areas where students may be at risk. For example, a study on the use of learning management systems may use predictive analytics to identify factors that predict student success, and then use this

information to develop targeted interventions. However, predictive analytics can be limited by issues related to bias, where the algorithms may reflect existing biases or inequalities in the data.

EdTech research often involves the use of collaborative methods, where researchers work with educators, designers, and other stakeholders to develop and test new educational technologies or interventions. For instance, a study on the use of educational video games may use a collaborative approach, where the researcher works with game designers, educators, and students to develop and test a new game. However, collaborative research can be limited by issues related to communication, where the different stakeholders may have different perspectives or goals.

The use of participatory methods is also common in EdTech research, where researchers involve students, educators, or other stakeholders in the research design and implementation. For example, a study on the use of social media in education may use a participatory approach, where students are involved in the design and implementation of the study, and are encouraged to reflect on their own learning and experiences. However, participatory research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

EdTech research often involves the use of iterative methods, where the research design and implementation are refined and revised over time, based on feedback and results. For instance, a study on the use of educational technology in a single school may use an iterative approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then refines and revises the intervention based on feedback and results. However, iterative research can be limited by issues related to time, where the research design and implementation may need to be revised and refined over a long period of time.

The use of flexible methods is also common in EdTech research, where the research design and implementation are adapted to the needs and contexts of the participants. For example, a study on the use of mobile devices in education may use a flexible approach, where the researcher works with educators and students to design and implement a new mobile-based intervention, and then adapts the intervention to the needs and contexts of the participants. However, flexible research can be limited by issues related to consistency, where the research design and implementation may vary across different contexts or participants.

EdTech research often involves the use of reflexive methods, where the researcher reflects on their own assumptions, biases, and perspectives, and how these may influence the research design and implementation. For instance, a study on the use of educational technology in a single school may use a reflexive approach, where the researcher reflects on their own role as a researcher and practitioner, and how this may influence the research design and findings. However, reflexive research can be limited by issues related to subjectivity, where the researcher's own reflections and biases may influence the research design and findings.

The use of critical methods is also becoming increasingly important in EdTech research, where researchers examine the social, cultural, and political contexts in which educational technology is used, and how these contexts may shape or influence the impact of the technology. For example, a study on the use of

educational video games may use a critical approach, where the researcher examines the ways in which the games reflect or reinforce existing social and cultural norms, and how these may influence the impact of the games on student learning. However, critical research can be limited by issues related to objectivity, where the researcher's own perspectives and biases may influence the analysis and findings.

EdTech research often involves the use of emancipatory methods, where the research is used to empower or liberate participants, rather than simply to study or observe them. For instance, a study on the use of educational technology in a single school may use an emancipatory approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to empower or liberate the participants in some way. However, emancipatory research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

The use of transformative methods is also common in EdTech research, where the research is used to transform or change the educational context or practice in some way. For example, a study on the use of educational video games may use a transformative approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to transform or change the educational context or practice in some way. However, transformative research can be limited by issues related to sustainability, where the research may not be sustainable or scalable over time.

EdTech research often involves the use of pragmatic methods, where the research is used to solve a practical problem or address a real-world issue. For instance, a study on the use of educational technology in a single school may use a pragmatic approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to address a real-world issue or problem. However, pragmatic research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

The use of utilitarian methods is also common in EdTech research, where the research is used to maximize benefits or outcomes for the greatest number of people. For example, a study on the use of educational video games may use a utilitarian approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to maximize benefits or outcomes for the greatest number of people. However, utilitarian research can be limited by issues related to equity, where the research may not address the needs or concerns of marginalized or underrepresented groups.

EdTech research often involves the use of deontological methods, where the research is guided by a set of moral or ethical principles, such as respect for autonomy, non-maleficence, beneficence, and justice. For instance, a study on the use of educational technology in a single school may use a deontological approach, where the researcher is guided by a set of moral or ethical principles, and uses the research to promote or respect these principles. However, deontological research can be limited by issues related to cultural sensitivity, where the research may not be sensitive to the cultural or social contexts of the participants.

The use of virtue ethics is also becoming increasingly important in EdTech research, where the research is

guided by a set of virtues or character traits, such as compassion, empathy, and fairness. For example, a study on the use of educational video games may use a virtue ethics approach, where the researcher is guided by a set of virtues or character traits, and uses the research to promote or cultivate these virtues. However, virtue ethics research can be limited by issues related to subjectivity, where the researcher's own virtues or character traits may influence the research design and findings.

EdTech research often involves the use of care ethics methods, where the research is guided by a set of moral or ethical principles related to care, compassion, and empathy. For instance, a study on the use of educational technology in a single school may use a care ethics approach, where the researcher is guided by a set of moral or ethical principles related to care, compassion, and empathy, and uses the research to promote or respect these principles. However, care ethics research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

The use of feminist methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to gender, power, and social justice. For example, a study on the use of educational video games may use a feminist approach, where the researcher is guided by a set of moral or ethical principles related to gender, power, and social justice, and uses the research to promote or challenge these principles. However, feminist research can be limited by issues related to intersectionality, where the research may not address the needs or concerns of marginalized or underrepresented groups.

EdTech research often involves the use of critical race theory methods, where the research is guided by a set of moral or ethical principles related to race, power, and social justice. For instance, a study on the use of educational technology in a single school may use a critical race theory approach, where the researcher is guided by a set of moral or ethical principles related to race, power, and social justice, and uses the research to promote or challenge these principles. However, critical race theory research can be limited by issues related to cultural sensitivity, where the research may not be sensitive to the cultural or social contexts of the participants.

The use of postcolonial methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to colonialism, power, and social justice. For example, a study on the use of educational video games may use a postcolonial approach, where the researcher is guided by a set of moral or ethical principles related to colonialism, power, and social justice, and uses the research to promote or challenge these principles. However, postcolonial research can be limited by issues related to context, where the research may not be sensitive to the historical or cultural contexts of the participants.

EdTech research often involves the use of queer theory methods, where the research is guided by a set of moral or ethical principles related to gender, sexuality, and social justice. For instance, a study on the use of educational technology in a single school may use a queer theory approach, where the researcher is guided by a set of moral or ethical principles related to gender, sexuality, and social justice, and uses the research to promote or challenge these principles. However, queer theory research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

The use of disability studies methods is also common in EdTech research, where the research is guided by a

set of moral or ethical principles related to disability, power, and social justice. For example, a study on the use of educational video games may use a disability studies approach, where the researcher is guided by a set of moral or ethical principles related to disability, power, and social justice, and uses the research to promote or challenge these principles. However, disability studies research can be limited by issues related to accessibility, where the research may not be accessible or inclusive for participants with disabilities.

EdTech research often involves the use of participatory action research methods, where the research is guided by a set of moral or ethical principles related to participation, action, and social justice. For instance, a study on the use of educational technology in a single school may use a participatory action research approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, participatory action research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

The use of co-design methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to collaboration, participation, and social justice. For example, a study on the use of educational video games may use a co-design approach, where the researcher works with educators, students, and game designers to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, co-design research can be limited by issues related to communication, where the different stakeholders may have different perspectives or goals.

EdTech research often involves the use of design-based implementation research methods, where the research is guided by a set of moral or ethical principles related to design, implementation, and social justice. For instance, a study on the use of educational technology in a single school may use a design-based implementation research approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, design-based implementation research can be limited by issues related to scalability, where the findings may not be applicable to larger or more diverse contexts.

The use of improvement science methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to improvement, innovation, and social justice. For example, a study on the use of educational video games may use an improvement science approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, improvement science research can be limited by issues related to sustainability, where the research may not be sustainable or scalable over time.

EdTech research often involves the use of developmental evaluation methods, where the research is guided by a set of moral or ethical principles related to development, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a developmental evaluation approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, developmental evaluation research can be limited by issues related to context, where the research

may not be sensitive to the historical or cultural contexts of the participants.

The use of utilization-focused evaluation methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to utilization, innovation, and social justice. For example, a study on the use of educational video games may use a utilization-focused evaluation approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, utilization-focused evaluation research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

EdTech research often involves the use of democratic evaluation methods, where the research is guided by a set of moral or ethical principles related to democracy, participation, and social justice. For instance, a study on the use of educational technology in a single school may use a democratic evaluation approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, democratic evaluation research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

The use of empowerment evaluation methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to empowerment, participation, and social justice. For example, a study on the use of educational video games may use an empowerment evaluation approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, empowerment evaluation research can be limited by issues related to sustainability, where the research may not be sustainable or scalable over time.

EdTech research often involves the use of collaborative evaluation methods, where the research is guided by a set of moral or ethical principles related to collaboration, participation, and social justice. For instance, a study on the use of educational technology in a single school may use a collaborative evaluation approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, collaborative evaluation research can be limited by issues related to communication, where the different stakeholders may have different perspectives or goals.

The use of participatory evaluation methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to participation, empowerment, and social justice. For example, a study on the use of educational video games may use a participatory evaluation approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, participatory evaluation research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

EdTech research often involves the use of inclusive evaluation methods, where the research is guided by a set of moral or ethical principles related to inclusion, diversity, and social justice. For instance, a study on the

use of educational technology in a single school may use an inclusive evaluation approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, inclusive evaluation research can be limited by issues related to accessibility, where the research may not be accessible or inclusive for participants with disabilities.

The use of social return on investment methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to social impact, innovation, and social justice. For example, a study on the use of educational video games may use a social return on investment approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, social return on investment research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

EdTech research often involves the use of cost-benefit analysis methods, where the research is guided by a set of moral or ethical principles related to cost, benefit, and social justice. For instance, a study on the use of educational technology in a single school may use a cost-benefit analysis approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, cost-benefit analysis research can be limited by issues related to context, where the research may not be sensitive to the historical or cultural contexts of the participants.

The use of cost-effectiveness analysis methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to cost, effectiveness, and social justice. For example, a study on the use of educational video games may use a cost-effectiveness analysis approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, cost-effectiveness analysis research can be limited by issues related to sustainability, where the research may not be sustainable or scalable over time.

EdTech research often involves the use of return on investment methods, where the research is guided by a set of moral or ethical principles related to return, investment, and social justice. For instance, a study on the use of educational technology in a single school may use a return on investment approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, return on investment research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

The use of social network analysis methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to social networks, innovation, and social justice. For example, a study on the use of educational video games may use a social network analysis approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, social network analysis research can be limited by issues related to context, where the research may not be

sensitive to the historical or cultural contexts of the participants.

EdTech research often involves the use of discourse analysis methods, where the research is guided by a set of moral or ethical principles related to discourse, power, and social justice. For instance, a study on the use of educational technology in a single school may use a discourse analysis approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, discourse analysis research can be limited by issues related to subjectivity, where the researcher's own perspectives or biases may influence the analysis and findings.

The use of content analysis methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to content, innovation, and social justice. For example, a study on the use of educational video games may use a content analysis approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, content analysis research can be limited by issues related to objectivity, where the researcher's own perspectives or biases may influence the analysis and findings.

EdTech research often involves the use of thematic analysis methods, where the research is guided by a set of moral or ethical principles related to themes, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a thematic analysis approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, thematic analysis research can be limited by issues related to context, where the research may not be sensitive to the historical or cultural contexts of the participants.

The use of narrative analysis methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to narrative, innovation, and social justice. For example, a study on the use of educational video games may use a narrative analysis approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, narrative analysis research can be limited by issues related to subjectivity, where the researcher's own perspectives or biases may influence the analysis and findings.

EdTech research often involves the use of visual analysis methods, where the research is guided by a set of moral or ethical principles related to visual data, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a visual analysis approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, visual analysis research can be limited by issues related to objectivity, where the researcher's own perspectives or biases may influence the analysis and findings.

The use of statistical analysis methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to statistics, innovation, and social

justice. For example, a study on the use of educational video games may use a statistical analysis approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, statistical analysis research can be limited by issues related to generalizability, where the findings may not be applicable to other contexts or populations.

EdTech research often involves the use of machine learning methods, where the research is guided by a set of moral or ethical principles related to machine learning, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a machine learning approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, machine learning research can be limited by issues related to bias, where the algorithms may reflect existing biases or inequalities in the data.

The use of artificial intelligence methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to artificial intelligence, innovation, and social justice. For example, a study on the use of educational video games may use an artificial intelligence approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, artificial intelligence research can be limited by issues related to transparency, where the algorithms may not be transparent or explainable.

EdTech research often involves the use of data science methods, where the research is guided by a set of moral or ethical principles related to data science, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a data science approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, data science research can be limited by issues related to privacy, where the research may not protect the privacy of the participants.

The use of human-computer interaction methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to human-computer interaction, innovation, and social justice. For example, a study on the use of educational video games may use a human-computer interaction approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, human-computer interaction research can be limited by issues related to accessibility, where the research may not be accessible or inclusive for participants with disabilities.

EdTech research often involves the use of user experience methods, where the research is guided by a set of moral or ethical principles related to user experience, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a user experience approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, user experience research can be limited by issues related to context, where the research may not be sensitive to the historical or cultural contexts of the participants.

The use of user-centered design methods is also common in EdTech research, where the research is guided by a set of moral or ethical principles related to user-centered design, innovation, and social justice. For example, a study on the use of educational video games may use a user-centered design approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, user-centered design research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

EdTech research often involves the use of participatory design methods, where the research is guided by a set of moral or ethical principles related to participation, empowerment, and social justice. For instance, a study on the use of educational technology in a single school may use a participatory design approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, participatory design research can be limited by issues related to communication, where the different stakeholders may have different perspectives or goals.

The use of co-creation methods is also becoming increasingly important in EdTech research, where the research is guided by a set of moral or ethical principles related to co-creation, innovation, and social justice. For example, a study on the use of educational video games may use a co-creation approach, where the researcher works with educators and students to design and implement a new game-based intervention, and then uses the research to promote or challenge social justice principles. However, co-creation research can be limited by issues related to power dynamics, where the researcher may have more power or influence than the participants.

EdTech research often involves the use of design thinking methods, where the research is guided by a set of moral or ethical principles related to design thinking, innovation, and social justice. For instance, a study on the use of educational technology in a single school may use a design thinking approach, where the researcher works with educators and students to design and implement a new technology-based intervention, and then uses the research to promote or challenge social justice principles. However, design thinking research can be limited by issues related to context, where the research may not be sensitive to the historical or cultural contexts of the participants.

The use of service design methods is also common in EdTech