UNIVERSITY POST GRADUATE RESEARCH (PGR) SHOWCASE

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Hackathon Space 2.04; Royal Docks Centre for Sustainability

Docklands Campus UEL -E16 2RD

Organized by:

ROYAL DOCKS SCHOOL OF BUSINESS & LAW

And

NOON CENTRE

Contacts:

Pjha@uel.ac.uk; E.BenMoussa@uel.ac.uk; T.Henderson2@uel.ac.uk

SHOWCASE

See document for Abstracts and School Affiliations.

Each presentation will be max 15 minutes followed by Q&A.

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Leveraging the Indian Railways ecosystem to combat child trafficking

Pankaj Chug; u2602466@uel.ac.uk

School of Childhood & Social Care

Programme: PhD; Start year: 2023
Supervisors: Meera Tiwari; Julia Davidson

ABSTRACT

Child trafficking (CT) is a critical issue globally; however, the mechanisms of victim transportation from source to destination remain underexplored in the existing literature. In the Indian context, most child victims are transported by traffickers through Indian Railways, but there is a lack of understanding of the phenomenon of CT at the intersection of IR. This study addresses this gap by employing a mixed-method empirical approach grounded in the capability framework to investigate the dynamics of child trafficking within the IR ecosystem. The aim of this study is to understand how existing resources and capabilities of the IR ecosystem can be leveraged to combat child trafficking effectively and sustainably. This study seeks to answer key questions related to the role of key IR actors in identifying child trafficking victims and the individual, social, and environmental conversion factors that enable proactive victim identification. Using an explanatory sequential design, quantitative and qualitative data is being collected in two phases from six major railway divisions across the three states of Rajasthan, Chhattisgarh, and Maharashtra. A purposive sampling strategy is employed, with participants comprising two subgroups: direct and indirect railway actors.

The findings from the first-phase survey data analysis inform the subsequent qualitative phase, involving in-depth semi-structured interviews to provide nuanced insights into the lived experiences, challenges, and perspectives of the railway actors involved. By adopting participatory and decentralised approaches, this study seeks to empower key actors, foster inter-departmental collaboration, and build community ownership of anti-trafficking interventions.The anticipated outcomes include a deeper understanding of the systemic and contextual factors influencing victim identification and a framework for leveraging the existing capabilities of the railway ecosystem to enhance anti-trafficking efforts. Ultimately, this study aims to bridge the gap between academia, policy, and practice by promoting sustainable and participatory strategies to combat CT within IR.

Keywords: *Child trafficking, Modern Slavery, Indian Railways, Victim Identification*

Semantic Framework for Advanced Cyber Threat Analysis and Sharing

Suleiman Sani Bashar; u1945432@uel.ac.uk

School of Architecture, Computer & Engineering

Programme: PhD
Supervisors: Bilyaminu A Romo, Umar-Muktar Ismail, Atiqur Rahman Ahad

ABSTRACT

The exponential growth in cyber threats poses critical issues to organizations across the globe where Small and Medium Enterprises (SMEs) remain seriously exposed as a result of inadequate access to sophisticated cyber threat intelligence (CTI). The high cost and complexity of CTI solutions are a burden to resource-limited organizations, which demonstrates why scalable, team-based cybersecurity resilience is necessary.

To put a dent in this issue of total, we developed and validated CTI-SHARE, an AI powered semantic framework which we put together to make advanced threat intelligence available to all organizations regardless of their resource base. We integrated into this framework, which is a semantic structure, well proven CTI standards and also put in ensemble machine learning algorithms.

With CTI-SHARE, we developed a platform for cyber threat intelligence sharing, heuristics analysis and report generation. We have put forth this innovative framework which is meant to improve the cyber security profile of resource-limited organizations thus we are in the process of building a more resilient global cyber environment.

Keywords: *Cyber Threat Intelligence, Artificial Intelligence, Machine Learning, Semantic Web Technologies, Cybersecurity, Small and Medium Enterprises, STIX/TAXII*

An analysis of British Muslim women's intersectional experiences in acquiring political office including the process of selection, election and operation of the work environment.

Nafisa Kiani; u2444483@uel.ac.uk

Royal Docks School of Business & Law

Programme: PhD; Start year: 2022
Supervisors: Qudsia Mirza; Siraj Sait

ABSTRACT

This study investigates the political experiences of British Muslim women, focusing on the processes of selection, election, and participation in political office. It aims to uncover the structural, social, and psychological barriers these women encounter, and how legislation, community dynamics, and personal resilience interact to shape their political journeys. Central to the study is the analysis of gendered Islamophobia and its impact on mental well-being, safety, and political progression.

Utilising a mixed-methods approach, the research will involve 25–30 British Muslim women engaged in politics. Participants will complete questionnaires and take part in follow-up interviews, conducted both in person and virtually. This methodology enables the collection of both quantitative and qualitative data to produce a nuanced understanding of their lived experiences.

Preliminary findings indicate that Muslim women in political spaces are disproportionately exposed to online and emotional abuse, which contributes to psychological distress and hinders political engagement. The study concludes by proposing measures to improve Muslim women's political representation and advocates for inclusive practices that recognise the intersectional nature of their marginalisation.

Keywords: *intersectional, political engagement, Muslim women, marginalization, gendered Islamophobia.*

Predictable Teaching Strategies to Support Attention and Learning in Early Childhood Maths

Lisa Ann Peters; u2045925@uel.ac.uk

School of Psychology

Programme: PhD; Start year: 2024
Supervisors: Sam Wass; Anna Gawthorpe; Gemma Goldenberg

Proposed thesis title: Knowing What's Coming: The Power of Predictability in Shaping Stress, Attention, and Learning Outcomes in Early Years Education

ABSTRACT

Unpredictable early environments have been shown to disrupt healthy development across emotional, cognitive and behavioural domains. In contrast, predictable environments have been shown to support improved outcomes, particularly during the first five years of life, when rapid structural and functional brain changes occur, and during which 90% of the brain's development takes place. Children's brains essentially function as prediction machines, constantly forming and testing predictions. When expectations align with reality, cognitive load is reduced, and more efficient learning happens. This may explain why young children are naturally drawn to predictable patterns in their environment, as it helps them to make sense of the world.

My research examines how predictable teaching strategies, including rhythm, repetition, and gestures, support attention and learning in early childhood classrooms, particularly in mathematics, an area where disadvantage has long-term implications. In England in 2013/14, 28% of children failed to achieve their expected level in mathematics by the end of the Early Years Foundation Stage (Department for Education, 2014), and those children who fell behind tended to remain behind throughout their school years. Addressing the attainment gap in maths in the early years is crucial, as it has been shown to predict future success and later life outcomes.

To address this, the current study will employ a mixed-methods approach, beginning with semi-structured interviews with practitioners, which will inform the development of the intervention: The Power of Predictable Teaching Principles, a neuroscience-informed approach to early teaching. The intervention will run over 16 weeks and will comprise children from nursery to reception (ages 3-5 years), from an East London Primary School. It will include gathering physiological data, such as ECGs, head-mounted cameras, and academic assessments, to enhance outcomes and provide all children with a solid foundation for future success.

Keywords: *Predictability, Early childhood development, Attention and learning, Early mathematics disadvantage, Neuroscience-informed intervention*

Exploring Habits and Patterns of Engagement with Online Dating Platforms

Katherine E. Joseph; u1543237@uel.ac.uk

School of Childhood & Social Care.

Programme: PhD; Start year: 2021
Supervisors: Ian Tucker; Ali Lara
Proposed thesis title: Exploring romantic love, digital media and subjective experience

ABSTRACT

Over the past decade, the prevalence and acceptance of digital channels as vehicles for cultivating and sustaining romantic relationships have witnessed substantial growth. This trend offers an expanded arena to investigate subjective experiences. In this research, I aimed to explore how the discourse of romantic love permeates the habits and patterns of engagement with online dating platforms (ODP) and the emotional and affective experiences of those engaging with these platforms.

The research framework draws inspiration from the perspectives of scholars such as Clough, Deleuze and Guattari, and Massumi. The notion of affect is approached as a pre-conscious bodily response, while emotions and discourse are perceived as outcomes of specific socio-cultural-historical contexts. Employing ethnographic note-taking and autoethnography, this study encompasses data collected from a diverse set of ODPs and relevant community threads, called subreddits, from the online discussion website Reddit.

Through ethnographic analysis, I suggest that love becomes materialised under a neo-liberal capitalist ethos by reproducing a sense of inequality, hijacking the practices and perceptions of romantic love to engender new habits to perpetuate narratives of personal deficiency. Offering a lens through which discourses may enter the body, this research offers a gateway to exploring the infra-empirical nature of affect, bridging the gap between discourse and embodied engagement. Further research into the subjective experience of those engaging in digitally-mediated romantic relationships would be beneficial.

Keywords**:** *Romantic Love, Affect Theory, Digital Media, Online Dating, Habits*

Enhancing Student Retention in High Education Institution (HEI): Machine Learning Approach

Emeka Cajetan Umendu; u2040693@uel.ac.uk

School of Architecture, Computer & Engineering

Programme: Prof.Doc. (Data Science) Start Year: January 2022
Supervisors: Md Atiqur Rahman A, Mustansar Ghazanfar, Aaron Kans

ABSTRACT

Each year, higher educational institutions (HEIs) in collaboration with government and funding agencies, grapple with persistent challenge: students leaving with unfulfilled potential behind by abruptly dropping out prematurely, depletes and limit resources. Retention of students surpasses a metric, but a lifeline covering for students and universities, shaping workforce readiness and reputations. So why do students leave and how can HEIs intervene? This study focused on a data-driven journey to answer the questions, appreciating machine learning potentials for predictions to prevent dropout.

Using historical data from UCI Machine Learning Repository and Student Performance Dataset, (34 features and 4424 students), we engage socio-economic status, financial constraints and academic performance to identify students at-risk. Our methodology covers systematic sequence: data scaling, SMOTE for balanced data, training four supervised models, (RF) 84%, (ETC) 88%, (LR) 75%, (GBC) 80%. 5-fold Cross-validation and Area under Curve (AUC), RF, ETC, LR, and GBC 95%, 97%, 88%, and 93%, exhibits a robust performance. Cumulative of academic credits, tuition fees payment, and Age at enrolment summaries the top best predictors. Results of the prediction guides early intervention for at-risk students in need of support.

These predictors were identified through SHAP analysis. The study contributes to HEIs as a retention strategy through a traceable approach, leveraging data-driven for easy identification, proffering support to vulnerable students for retention that are achievable through tutorials and liaising with funding bodies. By exploring and turning data into actions, create way for future ambitious students to flourish. Further studies shall consider the scalability of the model across HEIs to diversify institutional policies.

Keywords: *Student-Retention, RandomForest, ExtraTree, GradientBoosting, LogisticRegression*

Exploring the Lived Experience of People Living of People Living with Disabilities in Zambia: Diversity and Disability Theoretical Approach

Sharron Kunda Erinle: u1921443@uel.ac.uk

Royal Docks School of Business & Law

Programme; PhD: Start Year: 2024
Supervisors: Toyin Adisa, Kirk Chang, Muhammad Aktar

ABSTRACT

This paper provides a comprehensive review of the literature on the employment challenges faced by people living with disabilities (PLWD) across Europe, Asia, America, Africa, and Zambia as a localized case study. The study used desk review method to select 24 articles. Key words such as 'disability', 'diversity', 'employment challenges' were used to search for reputable databases such as JSTOR, Google Scholar, PubMed, and Research Gate. 24 peer reviewed studies published between 2000 and 2023 were included in the study. The main objective of the review was to analyse the employment barriers for people living with disabilities globally. Additionally, the study sought to establish the main theories underpinning studies on the barriers to employment for people living with disabilities (PLWDs). Findings reveal that the major barriers to employment for PLWDs include persistent inequities rooted in weak policy enforcement, cultural stigma, and structural exclusion. Additionally, the study found that analysed articles were mainly pinned by theoretical frameworks such as the social model of disability, human capital theory, and stigma theory to dissect systemic, cultural, and policy barriers.

The study examined indicates that they are based on three theoretical frameworks. The social model of disability (Oliver, 1990) contests the medicalization of disability, asserting that societal institutions, rather than individual disabilities, generate impediments. Secondly, human capital theory (Becker, 1964) is criticized for characterizing underemployment as a consequence of perceived productivity deficiencies, sometimes misused to attribute systemic failures to people living with disabilities (PLWD). Third, stigma theory (Goffman, 1963) examines how prejudice and stereotypes constrain opportunity, especially in cultures that associate disability with moral deficiency or spiritual retribution. These theories jointly guide the analysis of legislation, working practices, and cultural narratives across geographies.

High-Resolution Single-Cell Profiling of *Escherichia coli* Responses to Antibiotics Using AI

Afroza Rahman: u2633446@uel.ac.uk

School of Architecture, Computing & Engineering

Programme: PhD; Start year: 2024
Supervisors: Md Atiqur Rahman Ahad; Miraz Rahman; Seyed Ali Ghorashi

Proposed thesis title: Bacteria Behaviour Analysis using Artificial Intelligence regarding Antimicrobial Resistance

ABSTRACT

Antibiotics play an important role in fighting harmful bacteria. This is one of the great discoveries for humankind to save millions of lives from bacterial infections. Using Antibiotic inappropriately making it less effective on pathogenic bacteria which causes a problem called Antimicrobial Resistance (AMR). It means the bacteria can resist this antibiotic which was once used to kill it. In 2019, AMR was directly responsible for 1.27 million deaths. If no action is taken, annual global deaths could reach 10 million by 2050, exceeding cancer and result in economic losses of up to £78 trillion. AMR poses an urgent global health threat, necessitating advanced computational strategies to elucidate bacterial responses to antibiotics, behaviour of bacteria and its characteristic which cause resistance at single-cell resolution is urgent. In this study, we present an effective deep learning and ensemble-based framework for the classification and morphological profiling of Escherichia coli from fluorescence microscopy images. Using Cellpose for consistent single-cell segmentation, we trained thirteen deep neural networks including convolutional architectures and vision transformers to distinguish between untreated cells and those treated with antibiotic such as chloramphenicol, Mecillinam, MP265, and Nalidixic acid. The ResNet18 emerged as the best-performing individual model with an accuracy of 90% and an F1 Score. To enhance predictive performance and model generalisation, we developed an ensemble pipeline. Stacking ensemble using SoftMax probability concatenation and a logistic regression meta classifier achieved the highest accuracy of 94%, and minimal misclassification. Beyond classification, we quantified key morphological features such as cell area, circularity, and DNA to membrane intensity ratio, offering interpretable insights into phenotype focused structural changes induced by each antibiotic. This integrated framework not only delivers state-of-the-art performance in antibiotic classification but also provides scalable, interpretable tools for advancing the computational analysis of bacterial phenotypes, with implications for drug mechanism studies and AMR surveillance.

Keywords: *Antimicrobial resistance (AMR); Artificial Intelligence; Escherichia coli fluorescence microscopy; morphological profiling;*

Digital Inclusion for Adults: A Field Study Exploring Key Challenges Faced by Adult Learners in Accessing Digital Technologies in Urban Communities

Abdulghani LEILY, u2810467@uel.ac.uk

School of Education & Communities

Programme: PhD; Start year: 2025
Supervisors: Evgenia Theodotou; Andrew Ravenscroft; Paulet Brown-Wilsher

ABSTRACT

The digital world is evolving rapidly, impacting the daily lives of billions and underscoring the need for greater digital inclusion for adults. Ensuring universal access to technology is crucial for addressing the digital divide and enabling everyone to participate fully in education, employment, and social interaction in an increasingly digital society.

This research seeks to identify and address the barriers that prevent adult learners, particularly older individuals, from engaging confidently with digital technologies. These barriers often arise from socioeconomic disadvantages, educational gaps, and age-related factors. The study aims to propose practical strategies that support digital inclusion and promote equal opportunities for digital engagement.

The primary aim of this empirical study is to explore adult learners' understanding of digital exclusion, focusing on individuals who have self-identified as having limited IT skills. A mixed-methods approach will be used to examine both the digital capabilities and lived experiences of these learners. The research will contribute to policy and practice by offering evidence-based recommendations for improving digital inclusion in adult education.

To achieve this, the study will:

- Identify key barriers to digital inclusion using quantitative data from standardised surveys.
- Investigate the underlying causes of digital exclusion through qualitative focus groups.
- Provide actionable recommendations for service providers, software developers, and community stakeholders to support digital access and inclusion.

The study will be conducted within an Adult Community Learning (ACL) programme in a London borough, targeting learners aged 19 and over. Research will focus on participants enrolled in IT courses, particularly those who have self-identified as having limited digital skills. Diagnostic assessments will guide learner placement and support needs.

Keywords: *Digital inclusion, Digital separation, Cognitive overload, Digital literacy*

Enhancing Accuracy in London's Air Quality Data Analysis: Addressing Bias through a Comprehensive Framework

Ejaz Hussain; u2342306@uel.ac.uk

School of Architecture, Computing & Engineering

Programme: Professional PhD; Start year: 2022
Supervisors: Li Yang & Md Atiqur Rahman Ahad

ABSTRACT

In-scope research introduces a framework to address bias in air quality data analysis for London. With the rise of machine learning (ML), bias has become a significant challenge, threatening the accuracy of air quality assessments, which is crucial for policymaking. Current methodologies often overlook bias in the data processing stages, leading to inaccurate assessments and misguided policies. The research identifies a literature gap that has focused on aspects such as fairness and transparency but neglected biases in data analysis. To address this, the thesis proposes a holistic framework integrating multiple air quality datasets from London Air and UK Local Government Monitoring sites into a unified dataset for unbiased analysis. A scoring methodology assesses and mitigates bias risks throughout the data analysis life cycle, considering factors such as data source reliability, sensor inaccuracies, and confounding variables.

This framework aims to minimize bias at every stage, enhancing the validity and reliability of findings. The significance of this research lies in its potential to provide a systematic approach to ensuring unbiased air quality data analysis. Accurate data are essential for developing effective strategies to combat air pollution, a pressing concern for London and other urban areas. Furthermore, the framework serves as a valuable resource for researchers and policymakers, offering a systematic process for identifying and addressing bias in complex air quality data analysis. The research also highlights the ethical implications of biased data analysis, highlighting the need for transparency and accountability in the use of advanced data science techniques in public policy. The research findings have broad implications for both academia and policymakers, supporting the goal of achieving cleaner air and healthier environments for urban populations.

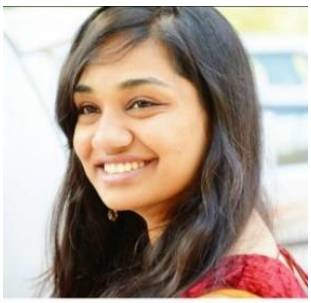
Keywords: *Air Quality, Bias, Data Analysis, Types of Bias, Bias Framework.*

A Multimodal Machine Learning Driven Approach for Real-time ESG Data Collection and Forecasting

Chanchal Jain; u2240956@uel.ac.uk

School of Architecture, Computing & Engineering

Programme: PhD; Start year: 2025
Supervisors: Nitish Chooramun, Fahimeh Jafari, Michael Harrison



ABSTRACT

As environmental, social, and governance (ESG) information becomes increasingly important to investors, regulators, and the public, it is very important that corporate sustainability claims can be trusted, backed by data, and represent actual action rather than just false claims. However, most of the ESG assessments are based on the information reported by the company, such as annual sustainability reports. These sustainability reports may not include all the relevant ESG information which makes them difficult to verify. This makes it challenging to determine how trustworthy a company's self-reported ESG performance is.

This research aims to develop new tools that will increase the credibility of ESG assessments by using artificial intelligence (AI) to identify possible discrepancies between what companies report and what independent sources suggest. The project's central component is a system that analyses company ESG reports with news sentiment and market data using machine learning models (ML) to detect possible inconsistencies. The method will identify any discrepancies, a measure that indicates if a company's actions are consistent with external perception, i.e., media coverage using the Global Database of Events, Language, and Tone (GDELT), the equity market responses and ESG scores.

One of the key applications of this work is greenwashing detection, where companies exaggerate their sustainability efforts. The platform will detect the cases of greenwashing and give a Greenwashing Risk Score, which will help investors and regulators to identify credibility problems at an early point. An online interactive web-based platform will be developed, which will have dashboards and a simulation tool that shows how different ESG strategies might affect a company's perceived credibility and the market's trust. This project aims to reduce ESG information discrepancies, build confidence in sustainability reporting, and motivate companies to follow through on their sustainability commitments, leading them from promise to action. It enables more transparent and accountable ESG assessment, particularly in the financial sector, where stakeholders need to make decisions based on credible and timely information.

Keywords: *ESG, Greenwashing, AI, ML*

Pathways out of Homelessness - A Human Agency Centered Approach

Mark Sustr; u1937071@uel.ac.uk

School of Architecture, Computing & Engineering

Programme: PhD (PT); Start year: 2022
Supervisors: Alan Chandler; Anna Minton; Roland Karthaus

Proposed thesis title: Self-Help Housing as a Pathway out of Homelessness: Exploring Agency, Stability, and Well-being through Biographical Research

ABSTRACT

Traditional homelessness programmes often restrict human agency and are frequently abandoned, prompting alternative approaches that recognise autonomy as key to lasting housing transitions. This doctoral research project explores *Self-Help Housing* (SHH) as a potential pathway out of homelessness. SHH engages individuals experiencing housing need in the refurbishment of long-term empty homes - either for their own use or for others facing similar challenges. Unlike traditional **consumer models** of homelessness services, in which clients passively receive support, SHH represents a **producer model** that emphasises agency, collaboration, and co-production. It aims to foster community, sociability, and mutual support as participants actively contribute to their own or other's housing solutions.

The study addresses a significant gap in current knowledge. While treatment-as-usual (TAU), consumer-oriented programmes have been widely researched, there has been little systematic exploration of agency-led alternatives like SHH. To date, no studies have examined the interplay between homelessness, personal agency, and housing-led approaches within a producer framework, nor followed participant's development over time. Existing evidence is largely anecdotal and lacks in-depth analysis of lived experience and long-term outcomes.

In collaboration with Giroscope, an early UK pioneer organisation of SHH that are located in Hull, this study aims to design and apply a biographical research method that tracks participant's experiences over the course of a year. Using longitudinal narrative interviews, the research explores how involvement in SHH may shape participant's sense of identity, housing stability, and well-being.

By combining case study and narrative enquiry approaches, the research takes an open and critical stance toward agency-centred approaches, seeking to understand how they are experienced in practice and whether they support meaningful and lasting transitions out of homelessness. By developing a method to understand the specific impacts of Self-Help Housing on people's lives, the study aims to generate insights that can help shape future homelessness policy.
Keywords*: Human Agency, Relational Working, Co-production*

AI Mobilisation Implications for Business Strategy
(Importance of Data Analytics knowledge at Corporate-Level)

Mabel St Germaine; u2540300@uel.ac.uk

School of Architecture. Computing & Engineering

Programme: Professional Doctorate in Data Science
Supervisors: Md Atiqur Rahman Ahad; Yang Li

ABSTRACT

This research presents empirical evidence on how executive AI Data Analytics skill variations can significantly enable business strategy alignment with AI and evaluates the assumption that lack of AI skills at Corporate Level (C-Level) might contribute to AI mobilization implications for business strategy. There are different streams of business models; Start-ups, Traditional (established businesses not utilizing AI technology) and AI Digital Transformation (businesses exploiting AI technologies to enable new business capabilities and data-based decision-making). This research, however, focuses on traditional business models and associated AI mobilization issues, causes and likely challenges. Traditional models are siloed structures, there is no sharing of data and this inability to share data, and knowledge leads to (i) duplication, overlaps and lack of awareness of different organizational projects (replications); (ii) lack of collaboration and sharing of processes/methods and (iii) different variable names and data formats between department applications (inconsistencies). Moreover, decisions are based on non-data-driven judgement, experience and intuition of the leading role, derived from lag metrics. The digital transformation model however, is driven by AI technologies and at the core is an organizational data-centric approach, where decisions are based on data. Lack of data analytics skills might lead executives having to resort to creating the role of data translators to bridge the void, translating generated analytic business insights on their behalf. The purpose of this research is to highlight how differences between AI digital transformation and traditional business models; coupled with the lack of analytics knowledge at C-Level, might result in AI mobilization implications for business strategy, due to failure incorporating resilience into business strategy architectures and future digital ecosystem plans. The research will identify knowledge gap in academic literature on executives' AI Data Analytics skills as it is the board that sets strategy and oversees its implementation; hence the need to understand the impact of AI technology on business strategy. The research extract both UK Financial Times Stock Exchange (FTSE) 100 and 250 companies' data from the London Stock Exchange, as they are more likely to portray a population representation of the country in terms of executive AI skills; and explore various machine learning models to find the best-fit for predicting executives AI Data Analytics skills gap and training requirements.

Keywords: *AI Digital Transformation, Business Strategy, Corporate Level (C-Level), Data Analytics, Traditional Model.*

Innovative Business Models in the Music Industry -The Role of 3D Printing in Customisable Instrument Production

Marcus M Araz; u2807174@uel.ac.uk

Royal Docks School of Business & Law

Programme: PhD, Start year 2024
Supervisors: Ozlem Ozdemir, Kirk Chang

ABSTRACT

This study explores the dual role of 3D printing as both a disruptive and sustainable innovation within the musical instrument manufacturing industry (MIMI). Traditionally, MIMI has relied on craftsmanship and premium materials, such as exotic tonewoods, which present ecological and economic challenges in today's sustainability-focused environment. The rise of additive manufacturing technologies introduces opportunities for decentralised production, rapid prototyping, and material efficiency, but its application in MIMI remains underexplored in academic literature.

Drawing on Christensen's Disruptive Innovation Theory, this research examines how 3D printing could challenge established value networks and enable new business models. It also integrates frameworks on Sustainable Innovation and Circular Economy (CE) to investigate how ecological and social considerations can be embedded into technological adoption. While existing studies on 3D-printed musical instruments focus predominantly on technical feasibility and acoustic performance, this research highlights a gap concerning the business model transformations and sustainability strategies enabled by additive manufacturing.

The methodology adopts a pragmatic philosophical stance, employing qualitative case studies and semi-structured interviews with luthiers, additive manufacturing experts, and musicians. Data will be analysed thematically using NVivo software to identify patterns in technological feasibility, cultural acceptance, and organisational innovation. The findings are expected to contribute theoretically by extending disruptive and sustainable innovation frameworks to a creative manufacturing context and practically by providing actionable insights for industry stakeholders and policymakers. This research aims to demonstrate how emerging technologies like 3D printing can redefine value creation in creative industries while supporting ecological and social objectives.

Keywords: *Sustainable Innovation, Circular Economy, Disruptive Business Model*