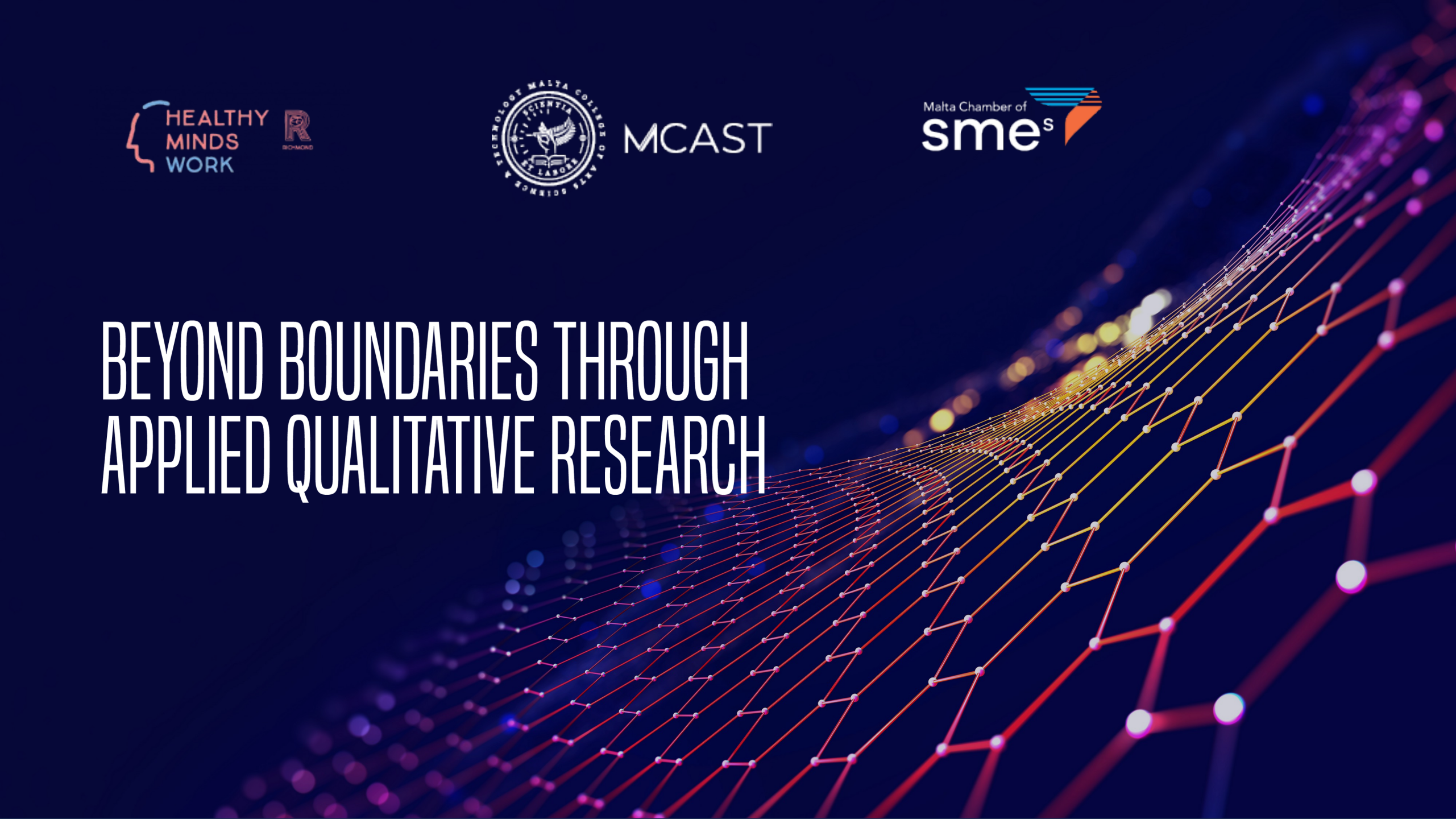
HEALTHY MINDS WORK

MCAST

Malta Chamber of SMEs

BEYOND BOUNDARIES THROUGH APPLIED QUALITATIVE RESEARCH



Enhancing Research Performance with Creative AI Tools

An AI-Assisted Grounded Theory Experiment

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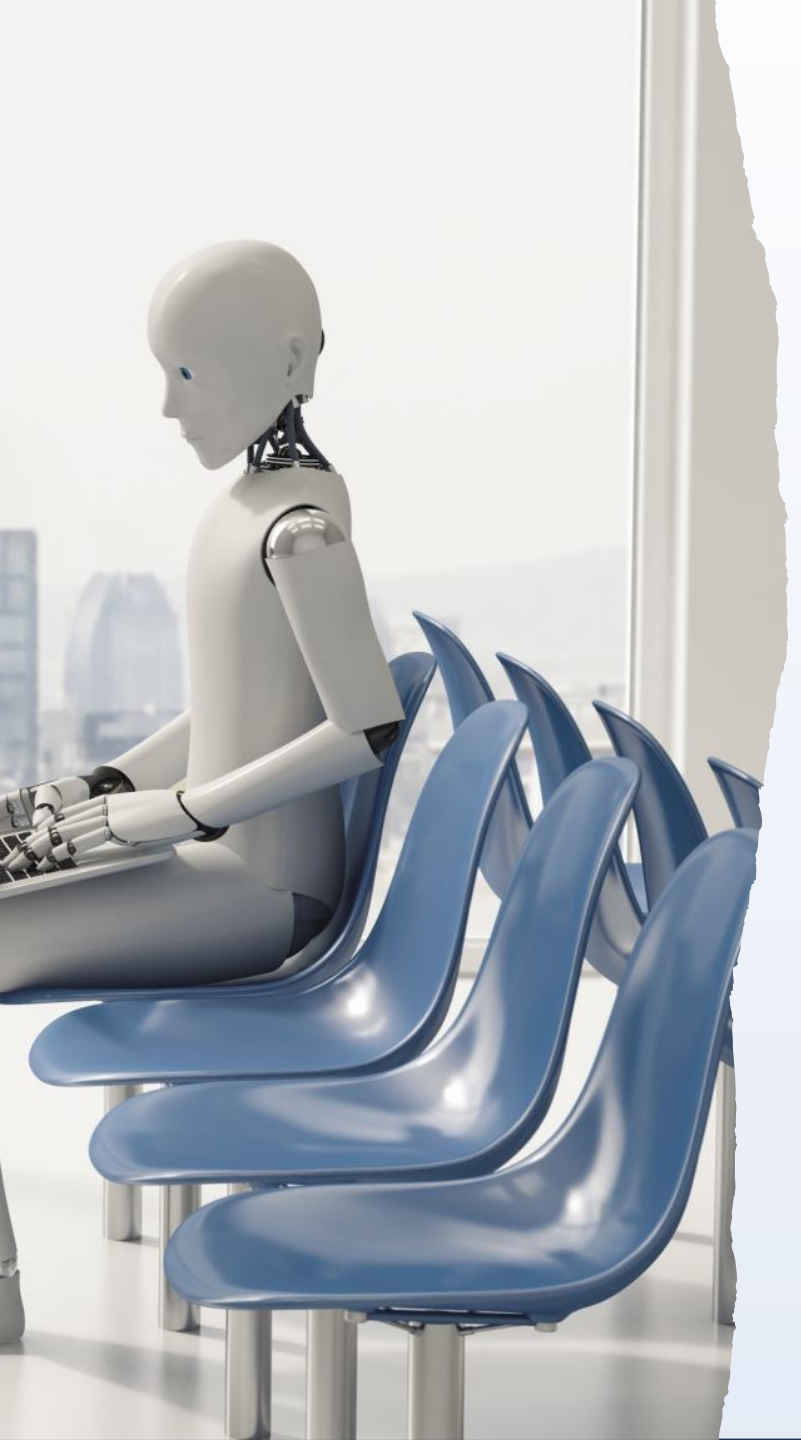


Background

- Developments in AI technologies, especially generative AI (GAI) and Large Language Models (LLMs) are suddenly taking place an unprecedented rate, raising both opportunities and concerns in industry and education sectors.
- Generative Pre-trained Transformer (GPT) models distinguish themselves in their ability to understand human-like prompts and generate contextualized and coherent responses (Zhang et al., 2023).
- Recently launched AI tools like GPT 3.5 and 4 (OpenAI 2023), Gemini (Google 2023), MidJourney, LLaMA (Large Language Model Meta AI), and LaMDA (Language Model for Dialogue Applications) can engage in dialogue, generate content, understand images, and even generate images.
- Given the ability to adapt to different scenarios and complexities, these tools are already impacting work processes within organizations like in customer care, marketing, and software development (Haleem et al., 2022).

Generative AI

GPT-1 OpenAI

Pride and prejudice are two powerful emotions that can be harmful to people.

ChatGPT OpenAI

“Pride and Prejudice” is a novel by Jane Austen that follows the love story of Elizabeth Bennet and Mr. Darcy as they navigate social conventions, misunderstandings, and their own personal flaws.

Research Questions and Objectives

Main Question: How can generative AI tools be effectively integrated into a Grounded Theory (GT) study?

Objectives:

1. Perform GT with a constructivist-driven approach.

2. Perform GT with a pure AI-driven approach.

3. Compare and propose a constructivist researcher-AI integrated GT methodology.

Literature

- The level of complexity of ‘big data’ means that analysis requires serious consideration, moreover when considering the need to maintain the rigorousness inherent in GT (Bryant, 2019).

- Inaba and Kakai (2019) provide a strategy named GTxA for a grounded text-mining approach. The authors position their strategy as a middle ground between objectivist and constructivist GT.

- Nelson (2020) proposes ’Computational grounded theory’ as combining human knowledge/skills with computational power and pattern recognition. While pattern recognition is the inductive exploration of text, pattern confirmation is concerned with assessing the inductively generated patterns.

- Abduction in GT: “Different from the situation of induction, in abduction we are confronted with thousands of possible explanatory conjectures (or conclusions) – everyone in the village might be the murderer” (Schurz, 2008, p. 203–204). Similar to a detective abduction consists of different strategies, such as backward reasoning (including all sorts of causal interpretations of traces), probabilistic evaluation of explanations and eliminations of implausible explanations.

Methodology Overview

Research Paradigm:

Constructivist ontology

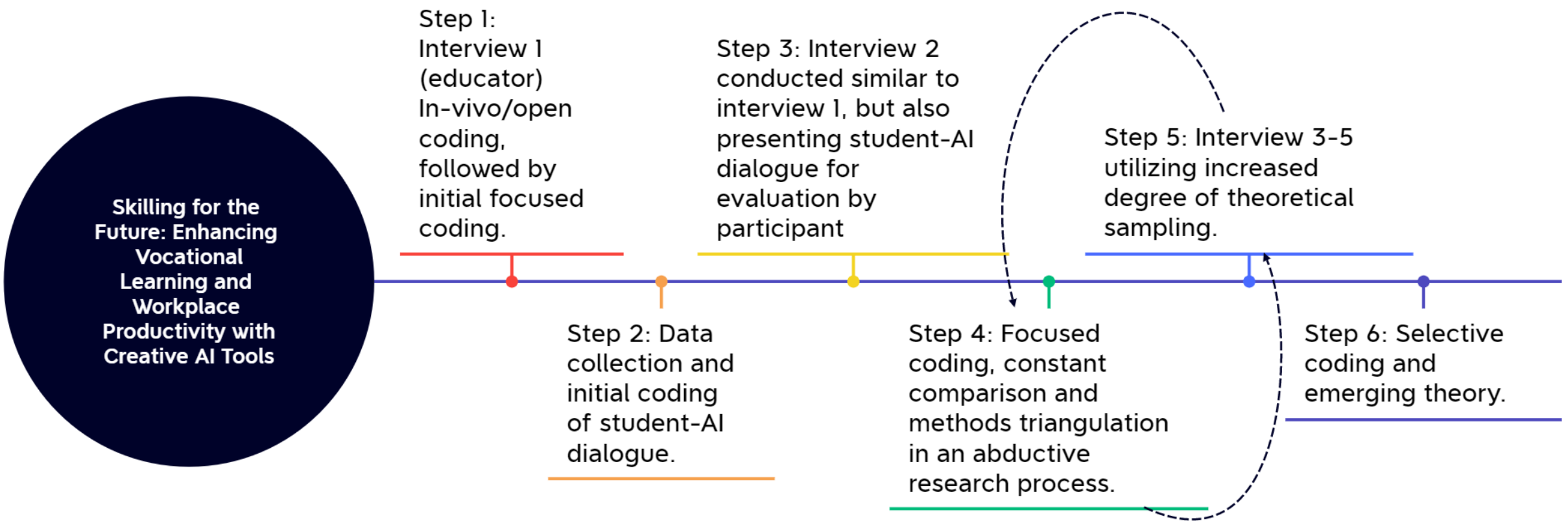
Data Collection:

Semi-structured interviews, AI dialogues

Analysis:

Constructivist-driven GT and AI-driven GT

Research Pipeline



Constructivist-Driven GT Process

Steps:
1. Initial coding
2. Focused coding
3. Theoretical coding
Tools: MAXQDA software for transcription and coding

AI-Driven GT Process

Steps:
1. Automated transcription
2. Initial coding with MAXQDA AI-Assist / GPT-4
3. Intermediate coding
4. Advanced coding
Tools: Whisper speech recognition model, MAXQDA AI-Assist, GPT-4 API

Findings: AI vs Constructivist-Driven GT Comparison

Researcher (constructivist)		AI (objectivist)	
In-vivo	**Initial coding**	**In-vivo**	**Initial coding**
It's like an assistant that helps you	AI assistant	It's like an assistant that helps you...It saves a lot and a lot of time on many things	Perception of GPT as a time-saving assistant
For coding like bespoke, to create dummy texts for a website	Efficiency and time-saving	I use it on 2 levels...for coding like bespoke and in my work to create dummy texts for a website	Multifaceted usage of GPT for communication and coding
In my work the development is the last mile... you know everything how it works, then I use coding to provide some twists according to particular needs	Simplifying coding tasks	In my work the development is the last mile...Most solutions are ready you know everything how it works then I use coding to provide some twists according to particular needs	Utilizing GPT for final touches in development
It's more exhaustive...It avoids warnings	Uses of AI tools	I wouldn't say creative. It's more exhaustive...It avoids warnings	GPT perceived as exhaustive and preventive

KEY OBSERVATIONS: **- DIFFERENCES IN CODING STYLE** **- DEPTH OF ANALYSIS**

Findings – Intermediate Coding AI-Driven GT

Category	Merged Categories	Rationale
Technological Focus	'Technological Advancements' and 'Technological Change'.	Both categories addressed aspects of technological evolution and its impacts, making them highly interconnected. Merging them created a broader category that encapsulates the full spectrum of technological development and its implications.
Workplace Dynamics	'Work & Employment', 'Productivity & Efficiency', 'Social Dynamics & Resistance'.	These categories collectively addressed the dynamics of the workplace, including the impact of technology on employment, productivity, and social interactions within work environments.
Risk and Security	'Risk & Limitations', 'Security Measures'.	Focused on the challenges and protective measures associated with technology and workplace environments, emphasizing need for security and recognition of potential risks.
Educational and Learning Aspects	'Educational Dynamics', 'Learning & Adaptation'.	Both categories related to learning processes, educational strategies, and adaptability in the face of technological changes, making them complementary.
Service and Quality Focus	'Service & Quality', 'Quality & Attention to Detail'.	These categories highlighted the importance of service excellence and meticulous attention to quality in products and services, relevant in both technological and educational contexts.
Strategic and Management Aspects	'Strategic Planning & Management', 'Prompting & Control'.	Covered aspects related to strategic decision-making and management control systems, including how strategies are formed and implemented in response to technological advancements.

KEY OBSERVATIONS: RELATIONSHIPS WERE IDENTIFIED BETWEEN CATEGORIES AND THE ANALYSIS IS REFINED.

AI vs Constructivist-Driven GT Comparison

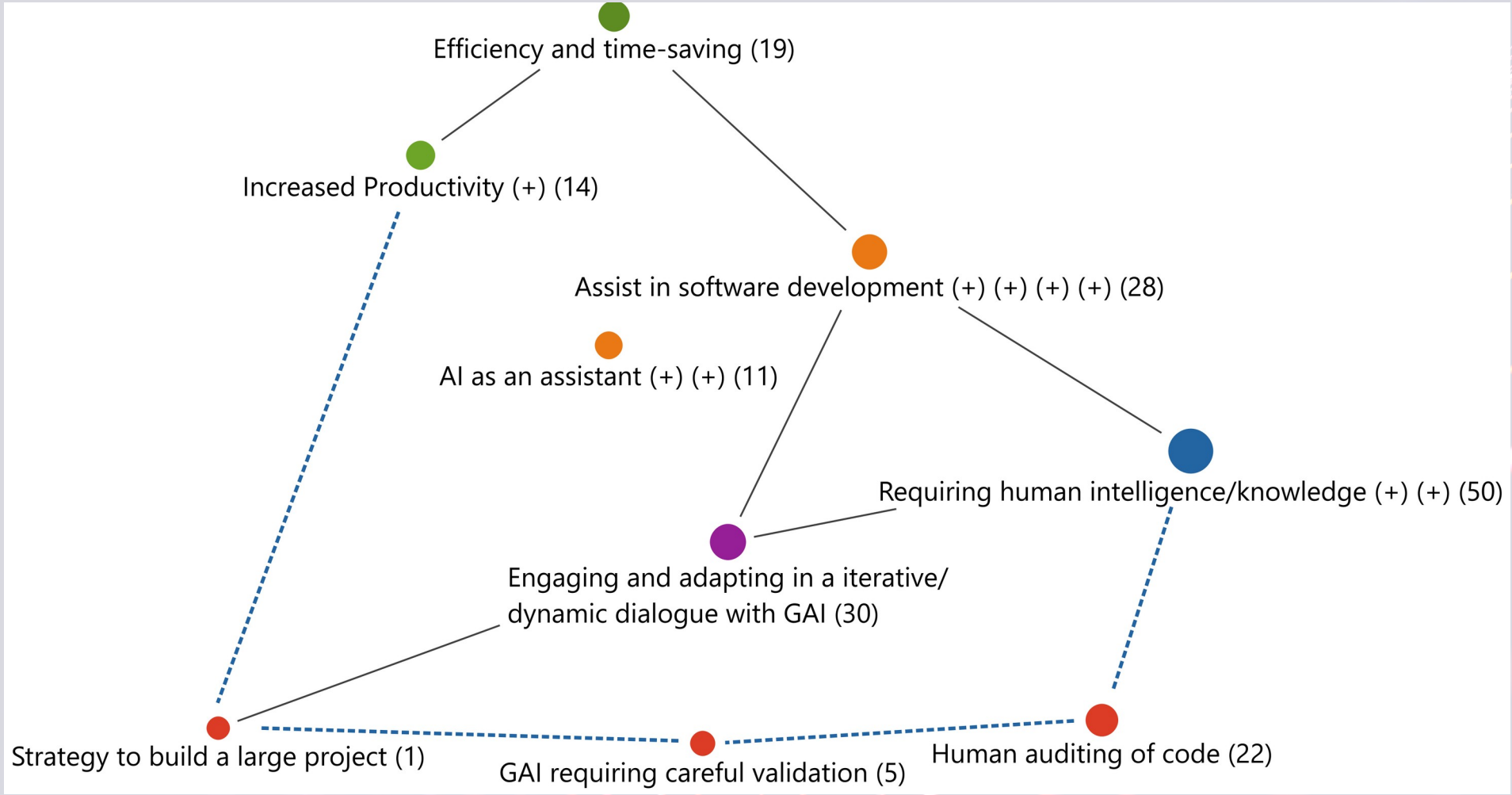
AI-driven GT Concepts	Constructivist-driven GT Concepts
Policy and Educational Change	Changing Landscape of Education
Ethical, Social and Policy Considerations	Ethics, Trust and Validation
Sector-Specific impact of AI	Changing Landscape of Industry
AI Integration and Application	AI features

KEY OBSERVATIONS: - SURPRISING NEW INSIGHTS ALSO EMERGED.

- ASSISTED THE CONSTRUCTIVIST RESEARCHER IN THE ABDUCTIVE PROCESS

- HUMAN ANALYSIS TENDS TO ABSTRACT AND INTERPRET DATA IMMEDIATELY

Effective AI Use: Code Clusters, Intersections and Proximity



Critical evaluation of exclusive AI-driven GT

1. GAI tends to be ’lazy’ and needed to be prompted multiple times to provide a complete detailed coding schema.

2. GAI models tend to ’invent’ ideas (hallucinations) or ’reason badly’ especially if not prompted in great detail.

3. Non-deterministic nature of GAI: reasoning and generated codes varies from one test to another even with same prompt and with the same data

Initial conceptual model

Points for discussion

GAI empowering resrearch		Point for discussion
Integrated constructivist-AI GT	1	An ‘integrated constructivist-AI GT’ pipeline can assist abduction by potentially unearthing new insights, assist the research in theoretical sensitivity and improve reflexivity.
The dichotomy of human vs AI knowledge generation	2	The use of GAI to assist research presents an unprecedented opportunity to improve quality in research, but only if used correctly! The study is indicating that the quality of GAI knowledge generation depends on the level of human intelligence using it, especially in specialized domains.
Ethics, trust and validation	3	While industry adopts a more utilitarian stance, academics are rightly apprehensive on possible over-reliance or abuse, with the new reality possibly already shaking the foundations of academic integrity and ethical frameworks.

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Questions?