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**To cite this article:**

Hammoda, B. (2024). ChatGPT for founding teams: An entrepreneurial pedagogical innovation. *International Journal of Technology in Education (IJTE), 7*(1), 154-173. https://doi.org/10.46328/ijte.530

International Journal of Technology in Education
2024, Vol. 7, No. 1, 154-173 https://doi.org/10.46328/ijte.530

# ChatGPT for Founding Teams: An Entrepreneurial Pedagogical Innovation

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## Article Info

***Article History***

Received:
23 June 2023
Accepted:
29 November 2023

***Keywords***

ChatGPT
Entrepreneurship education
Founding teams
Generative AI
Pedagogical innovation

## Abstract

ChatGPT is taking the world and the education sector by storm. Many educators are still hesitant to integrate it within their curricula, owing to the limited practical and theoretical guidance on its applications, despite early conceptual studies advocating for its potential benefits. This pedagogical innovation applied an effectual logic to implement ChatGPT for a founding team activity within an entrepreneurship course. Composing a founding team is an inundating task in venture creation, with long-lasting consequences. So far, there is yet to be an ideal approach proposed in literature or observed in real-life for doing it. In this pedagogical innovation, three student teams with varying business ideas prompted ChatGPT using different keywords and levels of details, to get recommendations on essential team members, their roles and equity split. Each team presented their findings, and then the classroom engaged in a collective discussion. The students were surveyed afterwards to assess the reception and effectiveness of the intervention. Their feedback showed an overwhelming favoritism of ChatGPT, as a convenient and resourceful learning tool. The study establishes the potential value of ChatGPT as a heutagogical tool that supports student-centric entrepreneurial learning across educational institutions and the entrepreneurship ecosystem that extends to the venture creation process.

## Introduction

The advent of ChatGPT towards the end of 2022 (OpenAI, 2022) is already being regarded as a key milestone in human history (Lim et al., 2023; Lodge et al., 2023; Winkler et al., 2023). The new “humanized” AI chatbot has changed the way we regard the potential of “machines” in different aspects of life, with almost every industry and individual trying it out for a myriad of different purposes (Berg et al., 2023).The education sector has been split on how and whether to approach it (Qadir, 2022), as it has been hesitant with exploring and incorporating artificial intelligence (AI) applications (Alneyadi & Wardat, 2023; Brunetti et al., 2020; ElBanna & Armstrong, 2023; Farrokhnia et al., 2023; Mucharraz et al., 2023). Although early studies, mainly conceptual, have listed several potential benefits to students and educators such as improving learning outcomes, supporting a student-centered approach, increasing efficiency of the educational process, helping with course design and improving critical thinking and reflective skills (Alshater, 2022; Farrokhnia et al., 2023; O’Connor & ChatGPT, 2023; Terwiesch, 2023; Zhai, 2022), some academics are still skeptical of embracing it in their pedagogies as they fear its potential

negative impact, as in facilitating cheating and plagiarism (Susnjak, 2022), diminishing students' cognitive abilities (Kasneci et al., 2023) and substituting for researchers and lecturers. Within the entrepreneurship education field, scholars are still to make their move as the discipline is late on exploring the potential of applying artificial intelligence and other advanced technologies.

This study is among the first to explore its empirical applications for teaching entrepreneurship through describing a pedagogical intervention using it in an entrepreneurship course for undergraduates. It applies an effectual lens to implementing ChatGPT for a founding team composition activity, thus positioning it as an effective tool to make the best of entrepreneurial resources at hand and adjust to the dynamic entrepreneurial contingencies (Bojica et al. 2018; Sarasvathy, 2001). Forming a coherent and effectively performing founding team is among the most ardent tasks in building a new venture. The founding members of s startup often exhibit different backgrounds and experiences, and have varying expectations with regards to their roles, leadership sequence and remuneration structure (Ruef et al., 2003; Shepherd et al. 2021). There are several discussions in literature with regards to founding teams' compositions, with some authors advocating for homogeneity among its members and other enumerating the benefits of having a diverse leadership team (ibid). However, there is a lack of clarity among researchers and practitioners on a working formula for structuring founding teams (Klotz et al., 2014). Hence, ChatGPT with its advanced computational capabilities that pulls on a wide pool of factual evidence to provide contextually relevant answers to user prompts (Alneyadi & Wardat, 2023; Farrokhnia et al., 2023), could be well suited in our opinion to play an important role in clarifying the nuances of founding teams' composition and guiding nascent entrepreneurs on forming effective teams. We herein through this pedagogical innovation posit ChatGPT as a heutagogical tool that can provide student centred learning experiences, that adjust to the evolving situational needs (Gibb, 2002; Rae, 2005) in a dialogical approach.

The objective of this pedagogical innovation is to explore the suitability and effectiveness of applying ChatGPT as an entrepreneurial education tool, to support students with developing a better understanding of founding teams compositions in different entrepreneurial scenarios.The students in this activity used ChatGPT as an advisory figure to provide them with recommendations on the composition of the founding team for their startup idea and possible split of equity. They prompted ChatGPT repeatedly, individually and as a group, using different combinations of keywords and information pieces about their startup and then reflected as a group on the recommendations it provided to extract learning lessons and best practices of using generative AI for entrepreneurial support. The activity was positively received by the students as extremely useful ($\mu$= 4.7, $\sigma$ = 0.46), rather easy to use ($\mu$= 4.2, $\sigma$ = 0.68), and convenient for entrepreneurial learning ($\mu$= 4.3, $\sigma$ = 0.64).

This pedagogical intervention is among the first to report on an empirical application of ChatGPT within the education sector, more specifically for entrepreneurship education. It also extends the argument for applying effectuation as the main logic for generative artificial intelligence applications for entrepreneurial support (Lupp, 2023) and establishes the connection of ChatGPT as a heutgogical tool rhyming with educational technology literature (Winkler et al., 2023). Educators can rely on this study to provide them with inspirations and theoretical guidance for developing their pedagogies (Farrokhnia et al., 2022) and incorporating ChatGPT within the educational process as a supportive and complementary rather than a substitutive tool, especially for educating

and empowering entrepreneurs (Haefner et al., 2021; Kakatkar et al., 2020; Obschonka & Audretsch, 2020; von Krogh, 2018). Hence, we conclude that ChatGPT can be effectively incorporated within the educational process (ElBanna & Armstrong, 2023) and we position ChatGPT as the missing link between entrepreneurship education and entrepreneurial action.

The paper is structured as follows: in the next section we elaborate on the relevant literature streams and concepts. We then describe the subsequent steps on the pedagogical innovation, and comment on its effectiveness and reception among the students through their submitted feedback forms. Moving forward, we discuss the pedagogical innovation against extant literature and highlight several contributions to both research and practice.

## Background Literature

Entrepreneurship education (EE) is highly regarded for its role in equipping future entrepreneurs with the required skills and tools to launch entrepreneurial ventures that contribute positively to our economies (Matlay, 2009; Pittaway & Cope, 2007). Traditional pedagogies teaching students "about" entrepreneurship is based on mechanistic knowledge imparting, following the cognitive model and have failed at disseminating practical knowledge and skills among students (Hägg & Kurczewska, 2021; Robinson et al., 2016). These are being replaced with more active approaches (Günzel-Jensen & Robinson, 2017; Robinson et al., 2016), that promote an experiential and self-driven learning (Hase & Kenyon, 2000, 2007; Jones et al., 2019; Neck & Corbett, 2018). Effectual logic is being recognized as one of the heutagogical and practical learning models that is gaining increasing popularity (Günzel-Jensen & Robinson, 2017).

However, this transformation mandated that educators and researchers go through a journey of exploration and experimentation with different sets of pedagogies applying a variety of learning paradigms, without a clear sight on to the ideal route to follow yet (Farroknia et al., 2022; Hammoda, 2023b; Neck et al., 2014; Neck & Corbett, 2018). In this part, we elaborate on the definitions and scholarly discussions literature on concepts and literary streams pertinent to this pedagogical innovation and build their linkages with EE and each other. These are effectuation, heutagogy and student-centred learning, founding teams, and our chosen delivery tool, ChatGPT.

### Effectuation

One method increasingly used in student-focused and practice-driven EE is effectuation. As explained by Sarasvathy (2001, 2008), effectuation implies that entrepreneurs begin with a general vision and use available resources, knowledge, and connections (who they are, what they know, and who they know). The direction is not set in advance, and they remain adaptive as they progress with their journey towards realizing their entrepreneurial aspiration, leveraging opportunities as they are made available to them and learn through their actions.

Building on effectual logic, entrepreneurship educators can adopt a processual approach to teaching that revolves around the learner. This approach leaves space for entrepreneurs to receive tailored support while they explore multiple options, take affordable risks, leverage connections at their disposal, make use of environmental

contingencies and learn on the job through experimentation. Hence, applying effectuation principles in EE challenges the causation-based dogmatic approaches to education (Morris et al., 2011), as it promotes heutagogical and student-centered pedagogies tailored around the learner needs, circumstances, resources and stakeholders (Rae, 2005). Hence, effectuation follows a constructivist and scaffolding approach to educating future entrepreneurs (Rae, 2005; Robinson et al., 2016). It offers personalized learning, develops entrepreneurial mindset, and improves self-awareness, which are critical aspects of entrepreneurial learning (Williams Middelton & Donnellon, 2014; Rae, 2005), leading to better outcomes (Fayolle & Gailly, 2008).

Effectuation core premise to make do with what's available (Daniel et al., 2015; Deligianni et al. 2017) is applied in the learning activity of this study, that leverages ChatGPT to train entrepreneurial students on founding teams compositions for their startups. ChatGPT is accessible to virtually everyone with internet access and does not require advanced technical skills to use (Tlili et al., 2023). Moreover, as the students try to explore several combinations of core members that can launch and run their venture, they follow an effectual approach to explore the different options available to them (Saravathy, 2001), by using an assortment of varying key words and sentences to prompt ChatGPT for situated responses. As their circumstances and existing resources change and the venture idea evolves and matures throughout the duration of the course and beyond (Sarasvathy & Venkataraman, 2011; Bojica et al. 2018), students can always come back to ChatGPT for up-to-date advice that suits their narrative. Hence, embodying the non-linear trajectory of an effectual logic to entrepreneurship (Sarasvathy, 2001).

Although EE focuses mainly on developing entrepreneurial competences (Nabi et al., 2017), these skills solely are not enough for entrepreneurial success as entrepreneurs need to learn how to enact them through a series of trade-offs in the daily startup life (Ibrahim & Soufani, 2002). Effectuation in practice focuses on supporting the decision-making behaviors of entrepreneurs (Servantie & Hlady-Rispal, 2018), with previous studies on AI applications in EE showing a strong support for developing decision-making abilities among learners (Ma et al., 2020). Moreover, effectuation is especially significant and effective in the early trial stages of starting a business, when entrepreneurs are faced with several options, have limited resources at hand and faced with surmount uncertainty (Perry et al., 2012; Sarasvathy, 2001). Hence, it is suitable for EE courses where students work in a scaffolding manner on shaping a workable business idea. However, despite its attractiveness and apparent naturalness, understanding and applying effectuation principles remains elusive and there is limited scholarly work in EE literature building on the effectual logic, with most of those studies being of a conceptual nature (Günzel-Jensen & Robinson, 2017; Perry et al., 2012).

**Heutagogy and Student-centered Learning**

Heutagogy emphasizes human agency in the learning process, where a person embarks independently on an intellectual journey of discovery and experience (Hase & Kenyon, 2000, 2007; Jones et al., 2019). Here in, heutagogy rhymes with student-centered approaches to education (ibid). Heutagogical pedagogies emphasize the role of the learner as the center of the learning process and the master of his own learning journey, through an interactive inquisitive approach, which is not confined to the standardized linear curricula (Gibb, 2002; Rae,

2005). In student-centered models, the educator, and universities endeavor to personalize the learning experience of their students and play a rather supportive and mentoring role to support their development of critical thinking skills (ibid). Heutagogy is thus a natural process for educators in the EE domain as it seeks transformational learning outcomes (Jones et al., 2019). Through these interventions, educators assist students in developing reflexivity, high self-efficacy, and competencies to be used in both familiar and novel situations without the educator's involvement (ibid).

Heutagogical approaches are tied to experiential knowledge acquisition and application, which is a common denominator they share with entrepreneurial learning and practice (Tunstall & Neergaard, 2022). Given the uncertainty of entrepreneurial realities, it has been argued that the theorizing around heutagogy fits well with entrepreneurship education (Jones et al., 2019; Neck & Corbett, 2018) and heutagogical pedagogies adds an element of learning for life to entrepreneurship students which is a key asset when facing uncertainties (Barnett, 2011; QAA, 2018). Thus, heutagogy is argued to be a fundamental element of transformational learning in any EE context. Rae (2005) also emphasizes the focus on the learner as the fulcrum of entrepreneurial pedagogies. Together with other scholars (e.g., Pittaway & Cope, 2007; Pittaway et al. 2011, 2015), he argues that entrepreneurial learning is better framed and enacted within the social and contextual environments of the learner. These propositions are thus in alignment with the effectual logic.

Advanced technology, such as AI applications, applied for educational purposes is considered a key enabler of heutagogical approaches, with ChatGPT posited as an enabler of student-centric pedagogies (Lodge et al., 2023; Mucharraz et al., 2023). It increases course attractiveness, opens access to wider groups of learners, transcending space, and time boundaries (Oyelere et al., 2016). It has been used effectively to shift EE into a more active, practical, and competency-based arena (Wu et al., 2018), and led to improved engagement, satisfaction and academic performance among students (Coccoli et al., 2014). Moreover, current university students belong to Generation Z who interact heavily with technology in every task. We assume that using advanced technologies in the classroom will bring a sense of familiarity and liking to the process (Mavlutova et al., 2020).

**Founding Teams**

Starups are usually founded by teams (Beckman, 2006; Klotz et al., 2014; Ruef et al., 2003), as they tend to be more sustainable (Reich, 1987) and able to secure better funding (Alsos et al., 2006). A founding team refers to a group of individuals who collectively create a venture. Founding teams have often varied experiences, bring in diverse attributes, sometimes have prior shared experiences, and are influenced by structure (Ruef et al., 2003; Shepherd et al. 2021). The attributes of each member of the founding team are important for new-venture creation (Wasserman, 2017), and thus a pragmatic reasoning when forming an entrepreneurial founding team, as in selecting members with relevant and complementary skills and experiences is usually followed by entrepreneurs (Klotz et al., 2014).

Several studies have pointed out to the importance of the heterogenicity of founding teams' collective powers (Franke et al., 2006; Kim & Aldrich, 2005) in terms of skills, educational backgrounds, and experiences

(Davidsson & Honig, 2003; Shah et al., 2019). The possession of several competences within the founding team is crucial to the success of the new venture such as technological knowledge (Gruber et al., 2013), financial mastery (Brinckmann et al., 2011), entrepreneurial and managerial experience (Gruber et al., 2013), industry-specific insights and connections (Walske & Zacharakis, 2009), and leadership skills (Franke et al., 2006). However, Shah et al. (2019) points out that the possession of certain skills such as critical thinking, problem solving, and sharing essential values and trust, i.e., homophily, are also important for effective founding teams' functioning.

Although the founding team characteristics affect startup prospects, researchers are still unclear on what team compositions and assortments are ideal for optimal firm performance (Devine & Philips, 2001; Ensley & Hmieleski, 2005; Klotz et al., 2014). Hence, there is a need for more studies on founding teams characteristics that are tailored to specific contexts and roles, as they can provide long-awaited answers to more nuanced founding teams settings (ibid). Entrepreneurial teams must deal with an exceptionally ambiguous and unchartered environment (Gartner, 1990; Schumpeter, 1934). The list of uncertainties they encounter include decisions related to customer segmentation and targeting, market selection and entry modes, human capital selection, organizational structures, and their portfolio of offerings (Karlsson & Nowell, 2021). These obscurities are heightened in learning settings, as students mostly lack professional or entrepreneurial experiences. In this situation, students can prompt ChatGPT for all those queries and receive reasonably situated guidance which is both contextually and semantically relevant. Hence, leveraging ChatGPT and AI assisted tools for entrepreneurship resembles a virtual form of mentoring and agglomerate community of enquiry, following a social learning paradigm from a heutagogical standpoint (Hammoda, 2023b).

**ChatGPT and AI for Entrepreneurship Education**

ChatGPT was launched late in 2022 by OpenAI, an AI innovation lab supported by Microsoft as a breakthrough communicative natural language processing (NLP) application that intelligently analyses text and visual prompts (requests) and provide narrative responses that are highly contextualized. A conversational AI, like ChatGPT, was conceptualized to have several potential benefits on education as in improving learning outcomes, supporting a student-centred approach, and increasing efficiency of the educational process (Ali & Abdel-Haq, 2021; Chen & Yu, 2020; Farrokhnia et al., 2023; O'Connor & ChatGPT, 2023; Peng et al., 2019). Moreover, it is argued to help improve critical thinking, discussion, reflection, and knowledge application capabilities among students (Alshater, 2022; Terwiesch, 2023). However, ChatGPT is feared for its potential negative impact, as in facilitating cheating and plagiarism (Susnjak, 2022), diminishing students' cognitive abilities (Kasneci et al., 2023), not providing enough depth (Choi, 2023), factual inaccuracies and potential bias (ElBanna & Armstrong, 2023, Farrokhnia et al., 2023) and substituting for researchers and lecturers. However, this fearful vibe is not uncommon when an innovative breakthrough starts gaining traction in society or academia (Mucharraz et al., 2023; Qadir, 2022).

The application of AI and ChatGPT for teaching and supporting entrepreneurship might sound alien. However, given their computational capabilities and knowledge resourcefulness, and the high levels of uncertainty and complexity that characterize entrepreneurial realities (Fayolle, 2018; Neck & Greene, 2011), we can argue that

their deployment for entrepreneurial learning (Blank, 2023; Chen & Yu, 2020; Shepherd & Majchrzak, 2022) is a natural occurrence. Early studies on their application in EE has shown their immense potential for providing more accurate planning and forecasting of entrepreneurial projects, while reaching larger groups of students through personalized support (Chen & Yu, 2020; Mavlutova et al., 2020; Ma et al., 2020). However, given the technical intricacies and theoretical and methodological obscurities associated with their implementation (Ma et al., 2020), as with other pedagogical interventions in EE (Farrokhnia et al., 2022), there has been little scholarly attempts to unravel their true potential.

## The Pedagogical Innovation

In this section, we elaborate on the pedagogical innovation in details, First, we explain the background of the entrepreneurship course and the pedagogical innovation build up, the setup of the seminar, where the ChatGPT learning activity took place, and the intended learning outcomes. We then identify and explain the activities undertaken in each of its six steps, which are visually illustrated and summarized in Figure (1). Finally, we report on the effectiveness and reception of the pedagogical innovation based on the results from a brief follow-up student survey and educator observations.

### Background

Building on the effectual logic, we took it in our own hands to experiment with ChatGPT as a heutagogical tool for EE. AI applications have proven to be of recognizable value in providing guidance to students and nascent entrepreneurs when making calls regarding several key decisions in the venture creation process (Chen & Yu, 2020; Mavlutova et al., 2020). Given the critical role of team composition in defining the prospects of a startup (Ruef et al., 2003; Shepherd et al. 2021) and that entrepreneurship students often lack professional experience and entrepreneurial networks, we decided to apply ChatGPT in a seminar on founding teams as part of an entrepreneurship course. The entrepreneurship course covers the basics of entrepreneurship for undergraduate students from both business and non-business disciplines and is organised over 12 weeks, through a mixture of lectures (4) and seminars (12). The ChatGPT based learning innovation was introduced as the main exercise in a seminar covering founding teams, towards the end of the course when the student groups had a more detailed and clearer view of their business ideas that they have been developing throughout the course. The seminar was of two hours duration. It typically involves a theoretical part and one or more practical group activities. It then ends with a collective discussion or Q&As with all students involved. The first theoretical part focused on discussing important aspects related to entrepreneurial teams such as characteristics, solo vs team of founders, common pitfalls, and shareholder agreements. This lasted for roughly 30 minutes. The main practical part is when we applied our ChatGPT based learning innovation and lasted for nearly an hour and a half.

### Setup

There were 20 students in the seminar organized in three groups, with each including 6-8 students. Although each group had several business ideas among its members them, we asked them to select only one for this activity. This

concentration ensured there is enough time allocated for in-depth discussion afterwards. Students were informed about the activity prior to the seminar. They were asked to sign up to https://chat.openai.com/ and familiarize themselves with the platform. They were also requested to bring along their laptops, which they naturally do in every class. The classroom where the activity was held was well prepared with separate "groupwork" tables equipped with a monitor each that you can plug in your laptop to.

**Intended Learning Objectives**

The learning innovation aimed primarily at educating students about the different compositions of founding teams, that vary according to the type of business. Also, to make them aware of the value that each of these roles contribute to the business, which is provided by the ChatGPT narrative explanation and justification of these roles and reflects on the suggested equity split (see appendices 1, 2, 3, 4, 5 & 6). It aimed at putting them in the driving seat as potential entrepreneurs, enacting entrepreneurial narratives where they get to interact with and seek advice from available resources in an effectual manner (Perry et al., 2012; Sarasvathy, 2008) and make decisions about their company accordingly. In drafting the learning objectives, we followed Bloom's taxonomy of educational objectives which charts learning activities for cognitive attainment in an ascending order: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956).

1. Understand how generative AI tools can help nascent entrepreneurs
2. Practice using generative AI tools
3. Analyze the results produced by the supportive tool
4. Synthesis those results for complementing your entrepreneurial idea
5. Reflect and evaluate your experience using ChatGPT, your learnings, and what to change in the future when using generative AI tools

**Process**

After the initial theoretical part of the seminar was concluded, we moved to the ChatGPT activity. In this part, we explain the different steps of the activity as it happened and provide some comments against each. The different steps involved in the process are depicted in Figure 1.

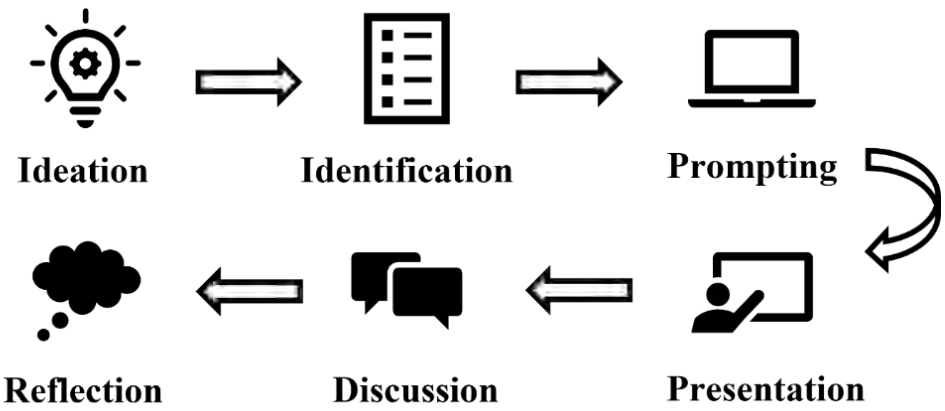


Figure 1. Steps of the ChatGPT Pedagogical Innovation

*Step 1 - Ideation*

The students have been working on business ideas in small groups 2-5 each throughout the course. For this activity however, students' groups were asked to join forces and self-form 3 relatively large groups of 6-8 each. They were asked to discuss among themselves and settle on one business idea to use for the activity. We also see that it is also possible if the students come up with an outline for a new business idea solely for the purposes of this activity. This can become relevant if it is conducted separately from an entrepreneurship course, as in training workshops and webinars.
Duration: 10 minutes

*Step 2 - Identification*

All groups were asked to write down a brief about the nature of their business, its main offerings, targeted customer segments and intended geographies for operations. This information was deemed essential to adequately prompt ChatGPT and receive adequate answers in advance. ChatGPT as a conversational tool provides contextual and semantically relevant responses (O'Connor & ChatGPT, 2023; Open AI, 2023), and the quality of the guidance it provides depends largely on the information included in the prompts (Kuhail et al., 2023; Tlili et al., 2023).The three ideas that the student groups agreed upon were found to serve the purpose of the exercise greatly by being distinctively different and cover a broad spectrum of real-life business. However, we suggest that other educators with bigger classes might want to get involved in defining the types of business to ensure required diversity.The first idea was for a laundry business, a traditional brick and mortar establishment without any significant technical knowledge. The second idea was for an ecommerce platform, which requires a significant marketing capacity, logistics experience and web platform building/ maintenance knowledge. The third was a legal software as a service (SaaS) offering, a heavily technological offering that requires advanced technical and domain expertise.
Duration: 10 minutes

*Step 3 - Prompting*

After having all necessary information about their business, students were asked to prompt ChatGPT, asking for guidance on the ideal founding team structure/ composition, the characteristics of the founding team or key members and suggested split of equity among them. Students were advised to use different combinations of keywords and sentence structures until ChatGPT provides them with a satisfactory enough answer.We allowed individual students within the groups to try asking ChatGPT separately to develop a sense of initiative and raise their personal AI literacy (Ng et al., 2022), as ChatGPT usage is intended as a heutagogical approach (Deng & Lin, 2022). However, we requested that one member takes charge of the communication as a group with ChatGPT to ensure consistency and get the students to discuss and work together among the groups effectively, which is an essential skill for entrepreneurs (Hammoda, 2023b).The final prompts used by the team leads for each group and ChatGPT responses are depicted in appendices 1, 2, 3, 4, 5 & 6 for reference.
Duration: 20 minutes

*Step 4 - Presentation*

After the exercise, each student group explained their startup idea briefly to the class, what they asked ChatGPT for (i.e., their prompts), ChatGPT responses and their comments on both prompting ChatGPT and the recommendations received.
Duration: 10 minutes for each group = total 30 minutes

*Step 5 - Discussion*

After all the groups finished sharing their experience, each group registered its idea, ChatGPT prompts and responses and these were made available to all the students through a collaborative learning platform. The whole classroom then engaged in an open discussion about the process, its pros and cons. Most importantly, they were asked to discuss and reflect on the suggestions provided by ChatGPT and the reasons for the differences in team compositions recommended by it, whether that being related to the nature of their business, its location, required partners, the type of offering, etc. This was an important step to achieve the intended learning objectives as in developing critical thinking skills, improving their understanding of different managerial topics, understanding how to better use ChatGPT (Rospigliosi, 2023), and internalising knowledge and skills through reflection (Gerstein, 2014).
Duration: 20 minutes

*Step 6 - Reflection and evaluation*

After the class, students were sent a brief survey to ask for their feedback and reflections on the learning innovation (Jones & English, 2004). They were asked to comment briefly on their experience. They were also asked to evaluate the perceived ease of use and perceived usefulness (Kemp et al., 2019) and convenience of using ChatGPT/ AI tool for learning against a 5 points Likert scale. Additionally, the students were asked to write a non-graded short reflective piece on their experience of using ChatGPT/ AI applications for entrepreneurship and learning more broadly, as an essential factor for introspection and internalisation of knowledge and expertise related to AI literacy to apply them in future entrepreneurial experiences (Corbett, 2005; Long & Magerko, 2020; Neck et al., 2014; Neck & Corbett, 2018).

**Evidence of Effectiveness**

To assess the effectiveness of the learning innovation, we relied on the educator's observations and the feedback survey responses. The educator observed students while participating in the classroom activity in terms of their level of engagement, transacting with their colleagues within groups and participation in the collective classroom discussion at the end of the activity. Although these observations are subjective, but generally and in comparison with other learning methods, the students were enthusiastically engaged in the activity and in the group discussions. This was evident through several instances. First, although most of the students affirmed that they only heard about ChatGPT but never tried it before, all participants in the seminar accessed ChatGPT and

familiarized themselves with it before they came to the classroom, to prepare themselves for the activity. Moreover, they all came prepared with their laptops. Second, all the students, while the educator was moving between tables, had ChatGPT open on their laptops and were actively prompting it. Thirdly, after each group presented their findings, the students started asking questions about the origins of the variance in ChatGPT recommendations and some volunteered in providing answers, enthusiastically.

A brief survey was sent out directly after the seminar to avoid recall bias (Schmidt et al., 2023). It requested that the students evaluate their experience using ChatGPT for receiving guidance on founding team composition, through three questions and an open feedback comment box (optional). In total, 17 out of the 20 students responded to the survey (85%). The responses were imported to Microsoft Excel and analyzed for the mean and standard deviation to understand the general agreement/ disagreement in student responses and the variance in students views, with regards to the survey questions (Stockemer et al., 2019). The results were overwhelmingly in favor of the ChatGPT learning activity. Students perceived it as extremely useful in supporting them in understanding the varying compositions of founding teams pertinent to the type of business and developing an insightful comprehension of the recommended constellations ($\mu$= 4.7, $\sigma$ = 0.46), and relatively easy to use for venture ideation and creation activities ($\mu$= 4.2, $\sigma$ = 0.68). They also found it to be rather convenient for entrepreneurial learning in comparison to the habitual lectures and classroom-based methods ($\mu$= 4.3, $\sigma$ = 0.64).

Commenting on their experience in the survey, the students felt that machine can support them and help guide their thinking. It also allowed them to use their time to think and reflect on the results and consider how to put it to action. They valued the collective discussion at the end of the activity as the most beneficial part in their opinion. ChatGPT recommendations were helpful from an entrepreneurial learning perspective indeed as in previous studies applying AI to EE have shown (e.g., Ma et al., 2020), but their synthesis of the dialogue with ChatGPT and then reflecting on the variances in the recommendations it provided was the essential part in their learning through this activity (Kolb & Kolb, 2005). Some excerpts from their responses included: *"*We enjoyed using it", "It made us feel that we are learning using the most advanced tools and not just theory", "Now, we feel more confident about starting a business, knowing how to use tools like ChatGPT and what kind of support we can expect from it", and "We believe it will be helpful to support other initiatives we pursue as well".

## Discussion and Implications

The advent of ChatGPT has raised attention of educators to the urgency of updating their pedagogies to include advanced technologies, especially those that are grossly adopted in students' daily lives and provide a sense of relevance to them (Alneyadi & Wardat, 2023; Hammoda & Foli, 2024; Neergaard & Christensen, 2017). This is significantly important in a practical and dynamic discipline like entrepreneurship (Neck & Corbett, 2018), where mechanistic traditional methods are falling short of achieving the desired outcomes of improving learners' skills and capabilities (Hägg & Kurczewska, 2021; Robinson et al., 2016).

This transformation necessitates a mindset change among educators towards a heutagogical and student-centered approach, where the lecturer relinquishes his role as the sole source of knowledge and transforms into a mentoring

and guiding role (Jones et al., 2019). This change is further accentuated by the ChatGPT impetus. This pedagogical innovation thus contributes to the heutagogical remodeling of entrepreneurship education and can serve as a guidance for fellow entrepreneurship educators on adopting advanced technologies, as in ChatGPT and AI applications. In doing so, it serves as an exemplar for applying advanced technology for transformative learning purposes (Mezirow, 2003). In addition, this pedagogical innovation is among the first to report on an empirical application of ChatGPT within the education sector, more specifically for entrepreneurship education, which is currently limited in literature.

The case builds on the effectual logic of Sarasvathy (2001) and adds to it by applying it within the context of entrepreneurial students. It thus extends the argument for applying effectuation as the main logic for generative artificial intelligence applications for entrepreneurial support (Lupp, 2023). It illuminates the potential for effectual approaches in supporting students morphing into active entrepreneurs (Krueger, 2007). By applying it within an educational context to potential student entrepreneurs, it provides additional avenue to support the work of both educators and researchers in the higher education space, as the original theorizing of effectuation as an entrepreneurial paradigm was based on analysis of experienced entrepreneurs' activities only. It also provides a much-needed empirical illustration of effectuation principles affixation to education practices (Günzel-Jensen & Robinson, 2017), by depicting the design, implementation, and assessment of the learning innovation, thus extending our limited understanding of effectuation process applications which are mostly dominated by conceptual work in extant literature (Engel et al., 2014). Moreover, we build connections between effectuation and heutagogy, in response to Perry et al. (2012) call for building relationships between effectuation and established paradigms.

We applied these learning and entrepreneurial models through a ChatGPT based activity for founding teams' composition. The purpose of prompting ChatGPT was to broker recommendations from its knowledge pool on the essential founding team members, their skills and equity split among them in relation to various startup business models with different characteristics. Thus, ChatGPT and similar advanced technologies help overcome limitations of knowledge sourcing and processing pertinent to entrepreneurial endeavors (Haefner et al., 2021; Nambisan, 2017; von Krogh, 2018). The significance of focusing on founding teams is in the crucial role it plays towards the success of a new venture (Wasserman, 2017). Thus, scholars have argued for the importance of conducting more nuanced studies on team characteristics in different situational and contextual factors (Klotz et al., 2014), such as nature of business, location and addressable market which were included by the students in their ChatGPT prompts.

Moreover, this empirical learning study adds to our understanding of the intricacies of founding teams compositions and their ideal alignment conducive to a well-performing venture (Karlsson & Nowell, 2021), which lacks an established methodology in entrepreneurship research and practice. It is worth noting that although having team members with complementary assortment of required skills and experiences is beneficial for firm performance (Beckman, 2006), this might not be enough for a burgeoning new venture. Several scholars have highlighted the importance homophily among team members as in their consensus, shared values and subsequent trust and emotional bonds on firm performance (Lazar et al., 2020; Ruef et al., 2003; Shah et al., 2019). Indeed,

entrepreneurship researchers posit that the relationships between team characteristics and composition are non-linear and thus no set rule can be applied (Devine & Philips, 2001; Ensley & Hmieleski, 2005; Klotz et al., 2014).

The results and recommendations provided by ChatGPT must be subjected to due consideration and reflections by the user to avoid potential bias and inaccuracies, however (Farrokhnia et al., 2023; Mucharraz et al., 2023). Overcoming this pitfall was designed into the pedagogical activity when students spent time reflecting on and discussing ChatGPT results versus their knowledge repositories and collective experiences. This reflective exercise was also a core component of their learning process by extracting new meanings and remodeling their cognitive mindmaps about the studied topic (Corbett, 2005; Kolb & Kolb, 2005), i.e., founding teams. In this regard, ElTarabishy (2023) advocates the use of ChatGPT in what he labelled as "The Socratic Method" to engage students in reflective conversations concerning the recommendations provided by ChatGPT. Hence, it is important for educators and students undertaking a similar learning activity to reflect deeply on the results provided by ChatGPT, in relation to their convictions and realistic entrepreneurial models.

Educators and instructional designers can rely on this study to provide them with inspirations and theoretical guidance for incorporating ChatGPT within the educational process as a supportive and complementary rather than a substitutive tool, especially for educating and empowering entrepreneurs (Haefner et al., 2021; Kakatkar et al., 2020; Obschonka & Audretsch, 2020; von Krogh, 2018). The implementation of ChatGPT in education indeed should happen through its integration within existing curricula, complementing theoretical knowledge rather than relying on it solely to achieve the desired learning outcomes. Although it does broker a student-centered approach as a heutagogical tool, we should not nonetheless subdue the role of the educator in guiding ChatGPT and similar technology-supported educational activities (Farrokhnia et al., 2023). Moreover, the ChatGPT activity effectively facilitated the shift in the positioning of the educator, to a facilitator of knowledge and skills acquisition. Hence, this study potential value transcends the educational institutions boundaries and can serve as a guidance to entrepreneurship and business actors in the community such as managers in accelerators and incubators, startup mentors and advisors, corporate intrapreneurship and innovation trainers, and the entrepreneurs themselves, on designing effective learning activities for their designated audience. However, we urge educators and leaders across the entrepreneurship ecosystem, to improve their digital and AI literacy in order to apply it adequately within their classrooms and varying learning spaces (ElBanna & Armstrong, 2023; Kasneci et al., 2023), and guide their students and trainees on using it appropriately (Neumann et al., 2023).

## Conclusion and Future Directions

This pedagogical innovation applied ChatGPT through a personalized and interactive approach (Gibb, 2002; Rae, 2005), to one of the critical tasks in the venture creation process; team foundation (Ruef et al., 2003; Shepherd et al. 2021). It elicited discussion and provoked reflection among the students to internalize the learning gains from their classroom experiences (Kolb, 1984; Rae, 2005). Our work coincides with several scholars' call (Gibb, 2002; Preedy et al., 2020) for more research and application of heutagogical approaches to entrepreneurial learning as a life-long constant process. Building linkages between EE and different learning models and theories will help us as educators and researchers in understanding what works and why, hence support us in developing better

pedagogies (Farrokhnia et al., 2022; Hammoda, 2023b; Robinson et al., 2016). In addition, this paper fulfils the need to accelerate our understanding and integration of emerging technologies in EE, as it is argued to become the dominant learning mode in the near future (Hammoda, 2023a; Mavlutova et al., 2020; Tretyakova et al., 2021).

We call for researchers, not only those focusing on education or entrepreneurship but from all other disciplines, to accelerate the scholarly efforts that aim at exploring, demystifying, and empirically studying possible applications of generative AI for educational purposes. On a broader ecosystem level, we call for the different educational and community actors to explore, try and fail, and communicate their experiences of integrating ChatGPT and similar advanced educational technologies in the methods they use to educate and train entrepreneurs (Winkler et al., 2023). Noting its conceptualized efficiency, personalization, and effectiveness, we advocate for EE agents and those concerned with its innovation to roll their sleeves and put it to test through empirical investigations, similar to this pedagogical innovation, aiming for an incremental and interconnected cycles of experimentation, reporting and reflecting (Corbett, 2005; Kolb, 1984). We conclude that generative AI and ChatGPT can be effectively incorporated within the educational process, and we position it as potentially the missing link between entrepreneurship education and entrepreneurial action.

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