Scientific and technological research article

How to cite this article: Sánchez-Bayón, A., Miquel-Burgos, A. B., & Alonso-Neira, M. A. (2025). Experience of learning technovation for i-entrepreneurship training: ¿how to prepare the students for digital economy? *Estrategia y Gestión Universitaria*, 13(1), e8765. https://doi.org/10.5281/zenodo.14908364

Received: 18/01/2025
Accepted: 25/02/2025
Published: 28/02/2025

Corresponding author: antonio.sbayon@urjc.es

Conflict of interest: The authors declare that they have no conflict of interest that may have influenced the results obtained or the proposed interpretations.

Antonio Sánchez-Bayón [1]
Universidad Rey Juan Carlos
https://orcid.org/0000-0003-4855-8356
antonio.sbayon@urjc.es
España

Ana Belén Miquel-Burgos [2]
Universidad Rey Juan Carlos
https://orcid.org/0000-0001-5658-0073
anabelen.miquel@urjc.es
España

Miguel A. Alonso-Neira [3]
Universidad Rey Juan Carlos
https://orcid.org/0000-0002-6778-3594
miguelangel.alonso@urjc.es
España

Experience of learning technovation for i-entrepreneurship training: how to prepare the students for digital economy?

Experiencia de tecnovación educativa para capacitación en i-emprendimiento: ¿cómo preparar a los estudiantes para la economía digital?

Experiência de technovation na aprendizagem para a formação em i-empreendedorismo: como preparar os alunos para a economia digital?

Abstract

Introduction: with the advance of digital economy and to avoid the feared technological stoppage, it is urgent to reconcile university and entrepreneurship, with the help of applications and artificial intelligence that facilitate this mission. **Objective:** to present a technovation learning experience, which trains students to become i-entrepreneurs. **Method:** the design is a descriptive and exploratory study that systematizes the background of ten years of experience, based on an active and collaborative learning experience, with gamification and inverted classroom, for teams that simulate being startups in a contest. **Results:** the content and structure provide a diagnosis of the situation, followed by a presentation of the experience and the main points in its development and implementation, to help anyone interested in replicating it. Among the results and findings, it is worth highlighting the greater commitment of the students, increasing their attendance and participation, verified in the grades and in the teaching quality surveys. **Conclusion:** This learning experience shows how to become a digital entrepreneur and thus overcome the dreaded technological unemployment. Students have been able to see for themselves the necessary relationship between the academic and professional worlds, as well as being able to undertake their own projects after the experience in the classroom.

Keywords: learning technovation, i-entrepreneurship, geek and talent method, sustainable development goals, infoproducts, artificial intelligence

Resumen

Introducción: con el avance de la economía digital y para evitar el temido paro tecnológico, urge reconciliar universidad y emprendimiento, ayudándose de aplicaciones e inteligencias artificiales que faciliten dicha misión. **Objetivo:** presentar una experiencia de aprendizaje de tecnovación, que capacite a los estudiantes para convertirse en i-emprendedores.

This is an Open Access article under the license CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/)

Método: el diseño es un estudio descriptivo y exploratorio que sistematiza los antecedentes de diez años de experiencia, basada en una experiencia de aprendizaje activo y colaborativo, con gamificación y aula invertida, para equipos que simulan ser startups en un concurso. **Resultados:** el contenido y la estructura ofrecen un diagnóstico de la situación, para continuar con la presentación de la experiencia y los puntos principales en su desarrollo y realización, para ayudar a quien esté interesado en su réplica. Entre los resultados y hallazgos, cabe destacar el mayor compromiso de los estudiantes, aumentando su asistencia y participación, verificado en las calificaciones y en las encuestas de calidad docente. **Conclusión:** esta experiencia de aprendizaje para mostrar cómo llegar a ser emprendedor digital y así sortear el temido desempleo tecnológico. Los estudiantes han podido comprobar por sí mismos la necesaria relación entre el mundo académico y el profesional, además de llegar a emprender sus propios proyectos tras la experiencia en el aula.

Palabras clave: aprendizaje de la tecnonovación, i-emprendimiento, método geek y talento, objetivos de desarrollo sostenible, infoproductos, inteligencia artificial

Resumo

Introdução: com o avanço da economia digital e para evitar o temido desemprego tecnológico, é urgente reconciliar universidade e empreendedorismo, utilizando aplicativos e inteligências artificiais que facilitem essa missão. **Objetivo:** apresentar uma experiência de aprendizagem de tecnovação, capacitando os estudantes para se tornarem i-empreendedores. **Método:** o design é um estudo descritivo e exploratório que sistematiza os antecedentes de dez anos de experiência, baseado em uma experiência de aprendizagem ativa e colaborativa, com gamificação e sala de aula invertida, para equipes que simulam ser startups em um concurso. **Resultados:** o conteúdo e a estrutura oferecem um diagnóstico da situação, continuando com a apresentação da experiência e os pontos principais em seu desenvolvimento e realização, para ajudar a quem estiver interessado em sua replicação. Entre os resultados e achados, destaca-se o maior compromisso dos estudantes, aumentando sua assiduidade e participação, verificado nas notas e nas pesquisas de qualidade docente. **Conclusão:** esta experiência de aprendizagem mostra como se tornar um empreendedor digital e, assim, evitar o temido desemprego tecnológico. Os estudantes puderam comprovar por si mesmos a necessária relação entre o mundo acadêmico e o profissional, além de empreenderem seus próprios projetos após a experiência na sala de aula.

Palavras-chave: aprendizagem de tecnovação, i-empreendedorismo, método geek e talento, objetivos de desenvolvimento sustentável, infoprodutos, inteligência artificial

Introduction

One of the great challenges into the universities, regarded students´ professional future, it is how to include learning experiences which connect digitalization-entrepreneurship-sustainable development goals-SDG (Herman, 2022; Gavrila & De Lucas, 2022; Cardeño Portela et al., 2023; López González, 2023; Jiménez-Pitre et al., 2023). To achieve this integration, an effective way is to carry out internships in which students learn by doing (Stan et al., 2021; Pérez Gamboa et al., 2022; Gonzales et al., 2023; Guerra et al., 2023), thus connecting what is studied in the classroom with reality and its demands. The scenario that our students face is conditioned by accelerated and constant technological changes (Volti & Croissant, 2024). However, similar situations have already been experienced in previous industrial, technological, energy and demographic revolutions (Sharma & Singh, 2020; Groumpos, 2021; see figure 1) –preceded by legal-political revolutions which favored those revolutions.

Table 1

Comparison between industrial, technological, energy and demographic revolutions

Revolutions	Traits	Macro and social indicators
1st. Revolution(s) (1760-1870, Atlantic Europe)	based on coal and vapour engine (i.e. trains); there was a social movement from country to urban workshops (highlighting the textile sector); civil contracts for leasing services (for agreed working days and services); the advance of the estates and guilds slows down	At that time, there were less than 1.2 billion people, with a global GDP per capita under $1,000.
2nd. Rev. (1880-1950, in Europe and the Anglo-Saxon world)	oil, electricity and assembly lines (for mass production); there was a transition from workshops to factories (with the automotive sector standing out); proper employment contracts (under a protective labour law regime); its progress is slowed (with accelerations and recessions) by wars and state interventions.	At the beginning of the 20th century, the world population was approximately 2 billion people, with a GDP per capita of over $1,000.
3rd. Rev. (1960-2008, in the West – especially, Asian tigers)	IT and robotization, more nuclear energy and renewables; we are moving from factories to centralized techno-bureaucratic headquarters and delocalized production and sales modules, more explosion of *malls* or shopping centres, with a variety of employment relationships and employability (civil and commercial contracts, labour, civil service, etc.). State interventions continue to alter its progress (this is the golden age of EB).	At the turn of the millennium, the world's population was over 6 billion and its GDP per capita was approaching $10,000.
4th. Rev. (2008-2030, planetarium)	Internet, programming (especially *block-chain* since 2009) and mobile phones (*smartphone* as an office), it is the era of social networks, *apps* & *everywhere*	There are currently more than 7.5 billion people on the planet, with an average global GDP per capita of over $14,000.

	commerce-ewc or virtual continuous marketing, giving rise to the return of the professional (*knowmads v. freeriders*), who can be a commission agent, biller, affiliate, etc. (new formulas for regulating mixed employment relationships emerge, i.e. *click-pay* , *flexecurity* , *part -time jobs mix*). It is also the period of the emergence of *smart-contracts & DAO* (intelligent contracts, as codes in the cloud, whose parts are artificial intelligences, which operate from the Stock Market to driverless driving).	
5th. Rev. (2030 – before: with the singularity)	or Artificial intelligence and transhumanism. Jevons paradox challenge on energy.	The demographic transition is complete, with the population and concentration of wealth not exceeding 10 billion.

Source: Own elaboration.

The key-idea of this work is this: How to promote the digitalization and to avoid technological unemployment? (Lima et al, 2021; Kuzior, 2022). Among the several noteworthy historical episodes, attention is drawn to the technological advances and the great economic development during the happy decade of 20s in the 20th century, which after the crisis of 1929 and the beginning of the Great Recession of the 30s, aroused great controversy among economists. Keynes (1930) wondered about the future of the work of "our grandchildren" with respect to technological change: if there are so many and so fast technological advances, will they be incorporated or will there be a technological stoppage? To avoid this scenario, it is urgent that business schools and universities teach students how to professionally integrate technological advances (Jandrić & Hayes, 2020), to be more productive and enjoy greater wellbeing possition (EU-Consilium, 2019a-b; Draghi, 2024; Sánchez-Bayón, 2022 & 2023).

This work is an oportunity to share with the university community an experience of digital teaching innovation (Esteve-Mon et al., 2020; Garzón et al., 2020), which has been successful, in terms of participation and recognition by students (with teaching quality surveys) as well as by academic authorities (with certificate-letters), offering the keys for its realization by other people interested. With this experience, in turn, we intend at the same time to address and integrate the sustainable development objectives (SDG), promote talent and digital entrepreneurship, in addition to recovering the original sense of university social responsibility, related to the commitment to the equal cultivation of ambitio dignitatis or civic/humanistic education to be a better person, and the ambitio pecuniae or professional preparation that makes it easier to be entreprenuer and to get better wellbeing and wealth possition (Sánchez-Bayón, 2021a-b).

This experience has been enriched by the widespread implementation of generative artificial intelligence since November 2022, following the announcement of the open distribution of ChatGPT by OpenAI and the race of Big-tech or large

technology companies (i.e. Google, Microsoft, Meta) to establish themselves in the market (Hutchinson, 2022; Khanal et al., 2024). This has given rise to a new socio-economic cycle (Tominc & Rožman, 2023), coinciding with the change in management and recovery from the COVID-19 crisis (Dobrowolski, 2020; Lv et al., 2023). The previous cycle started with the massification of social networks after the Great Recession of 2008 (Schirch, 2021; Barroso & Barroso, 2023). The previous cycle, in turn, began with the generalization of the Internet and open source, also after overcoming the economic-financial crisis in Southeast Asia (Wang et al., 2022). In this way, it is possible to easily observe the pattern of crisis and restart of the cycle with social transformation approximately every decade (Huarachi et al, 2020; Mielants & Bardos, 2020). The new cycle is interpreted differently depending on the economic school that is handled (a question that is clarified in the following section). What does seem to be shared by most teachers is their commitment to students (Siri et al., 2020; San-Martín et al., 2020), helping them to acquire practical knowledge (Hausmann & Hidalgo, 2014) that allows them to get a possition of wellbeing and wealth, through a minimum-cost entrepreneurship (tending to zero marginal cost), convergent with the digital economy and combining its expressions of collaborative and circular economy, automated economy and orange economy (Sánchez-Bayón, 2021a, 2022 & 2023).

This work is composed of the following sections: a) a review of theoretical and methodological frameworks: approaches and practices are reviewed, allowing a brief diagnosis of the situation, in addition to presenting the geek'n'talent method (GTM) or development of digital talent, for the digital entrepreneurship of infoproducts (and with it, respect for the SDGs), all of which is improved with the application of generative artificial intelligence (GAI); b) development of the experience and analysis of results: a systematization of work keys and a balance of the experience acquired are offered; c) discussion and conclusions: a balance is made, in addition to offering future lines of research.

As has been pointed out, this work seeks to disseminate a successful method of teaching and entrepreneurial innovation, oriented towards training in the global digital economy (and therefore of minimum cost and replicable in almost any environment), since it is based on the recycling of knowledge and talent to offer personalized experiences that allow students to earn a living, regardless of the moment of the economic cycle in which they graduate from university.

Materials and methods

Schools of economic thought can be divided in several ways, but here we follow the attitudinal classification towards digital change (Sánchez-Bayón et al, 2023): developers/developmentalists vs. degrowthers. According to this classification, the developmentalists (including liberalizing schools, i.e. Austrian Economics, New-institutional Economics) have a positive view (in favor and realistic), defending free trade, technological advancement and entrepreneurship, with adaptive proposals (i.e. GTM). In contrast, the degrowthers (including interventionist schools, i.e. New & post-Keynesians, institutionalists, socialists) have a normative view (opposite to the reality and request its change), defending state interventionism, technological control and wage employment, with regulatory

proposals and resistance to change (neo-Luddite type, Wolff, 2021). According to the degrowth advocates, the digital economy and artificial intelligence can only bring creative destruction (Schumpeter, 1942) and technological unemployment (Keynes, 1930), thereby using the SDGs as legal barriers to action. On the contrary, development advocates advocate a dynamic process of evolutionary adaptation (Hayek, 1988; Huerta de Soto, 2009), which allows all types of work that become obsolete to be replaced by new, increasingly creative jobs with better conditions (see section 2.2. and figure 2; Sánchez-Bayón, 2021a, 2022 & 2023), in addition to being more respectful of the SDGs, based on cleaner technologies, with less exploitation of resources and more focused on generating access and enjoyment experiences.

The recent literature reviews and meta-studies serve as a state of the art, such as the general approach by Trongtorsak & Nisook (2021), Figueiredo & Ribeiro (2022) or Sitaridis & Kitsios (2024); the longitudinal pre-COVID study by Purnomo et al. (2020), and post-COVID study by Paul et al. (2023); also, those with a micro approach such as Felicetti et al. (2024), and macro study by Oloyede et al. (2023); in terms of edges and trends, it is worth highlighting Kollmann et al. (2022) or von Briel et al. (2021). However, among these mainstream or dominant thought studies (as opposed to the heterodox mainline or foundational studies, which have been followed here, Boettke et al., 2016; Gaus, 2020; Sánchez-Bayón, 2022), the assumptions that clarify the relevance of teaching experiences such as this one in preparing for digital entrepreneurship have not been taken into consideration. Consequently, among the main problems detected and resolved with practices such as this one (and other complementary research that is part of the research program of the heterodox synthesis in this regard, Corduneanu, 2020; Kolev, 2020; Liu, 2022), it is worth noting:

a) Millennials and Generation Z (and later gens) are presumed to be digital natives because they were born with the digital boom, but they may just be digital tourists. It turns out that they use digital advances for leisure, but not for work, so they require training in this regard (hence the urgent need for training in GTM and AI).

b) University gap: within the European Higher Education Area, a gap has been detected between an institution with vestiges of the 19th century, with professors from the 20th century and students and future professionals from the 21st century. Hence, incentives must be introduced for the digitalisation of classrooms or there will be a greater loss of competitiveness (as is the case in most countries of the European Union, Draghi, 2024).

c) Ambitio dignitatis vs. pecuniae: this is a revitalization of the Byzantine dilemma applied to university studies and the social responsibility of the university, since it should not be seen as the antagonistic dilemma of training citizens (who seek to be better people) versus that of professionals (who seek to earn a better living), but rather the copulation of both (professional citizens or digital entrepreneurs). Therefore, digitalization and the use of AI should be carried out in this sense of copulation, instead of being seen as a threat and a high cost of change. It is about teaching with criteria and ethics to be more efficient.

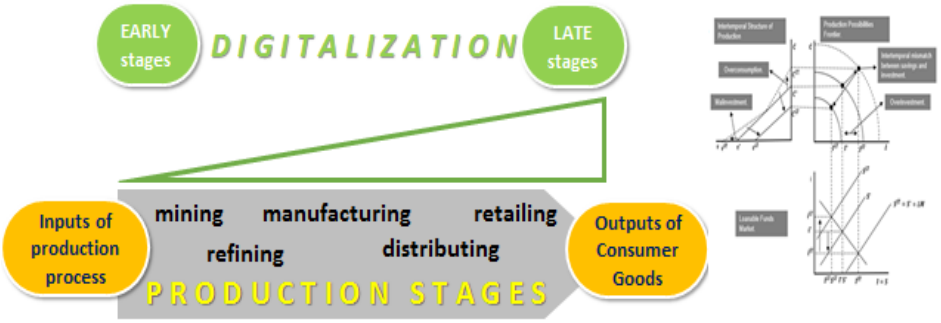
d) GAI as the Great Equalizer or the Great Gap: Currently, there are two theories on the impact of GAI, the first being the Great Equalizer, and the second the Great Gap or Social Gap. Initially, GAI can achieve the convergence of the worst students and professionals with the most talented, allowing them to deliver tasks at a lower cost in time and effort. However, over time the gap will reappear, increasing more and more, between those who merely use GAI and the talented ones who know how to make the most of it (this is a variant of the law of association and comparative advantage).

This explains why millennials and generations Z are ideal candidates for teaching innovation experiences such as this one.

To understand the problems detected and to offer solutions for its management, it is convenience to know about the method applied here: geek´n´talent method (GTM). The origin of this method is the work of Hayek (1935 and 1939), when he unveiled his production triangle and the so-called concertina effect (Kaldor, 1942), Ricardo (Gehrke, 2003) or readjustment (Sánchez-Bayón, 2023). The premise is that the closer a worker is to the consumption line, the less added value he or she can contribute and the greater the risk his or her job is, which could be replaced by capital intensification or capital goods. Therefore, said low-skilled workforce must be offered digital talent development training, which allows them to be relocated to more distant phases of the production process, so that their working conditions will be better, as well as their salary, etc. In essence, this is one of the main problems of the European Union today, since GTM and AI are not being applied to increase productivity, but merely to regulate its control (Draghi, 2024).

Figure 1

Readjustment effect and GTM



Readjustment effect: from mass-production (samething for everybody) to personal-experience (talent & apps with options)
The closer the work is to the consumption stage, the lower the added value and the greater the risk of substitution through digitalization. It is advisable to move jobs to phases far from consumption, but geek´n´talent training is required to provide more value (with better labor conditions and payments).

Source: Own elaboration (based on Sánchez-Bayón, 2022 & 2023).

As has been pointed out, the experience presented here refers to low-cost digital entrepreneurship. (low or minimum cost), respectful of the SDGs (reducing poverty and inequality, by offering new entrepreneurship opportunities for all and cheaper access), and via infoproducts (or digital servo-products based on knowledge to generate personalized experiences, Steininger, 2019). These infoproducts are based on scalable systematization thanks to digitalization, so that work is done once and recurring income is generated indefinitely. Such a practice becomes exponential thanks to GAI, since practically the entire production process can be systematized.

Results and discussion

Experience design

As indicated, this work offers a report on an experience of learning technovation resulted from the implementation of a replicable method of teaching innovation and entrepreneurship developed, and successfully tested since 2014 in business schools (i.e. EAE Business School, ESIC Marketing & Business School), since 2017 in professional schools (i.e. ISEMCO, Chamber of Commerce) and since 2019 in multi-campus universities such as the Rey Juan Carlos University (URJC): Alcorcon, Fuenlabrada, Madrid, Móstoles and Vicálvaro (with more than 46,000 students, URJC, 2024). In this experience has participated more than 3,000 students (more than 300 students each year), and a third of them has finally undertaken. The work was supported by several research and teaching innovation groups at URJC (GESCE-URJC, GID TIC-TAC CCEE, GID IODSEAE), and Business Schools (CIELO-ESIC Marketing & Business School). Thus, since the 2019-20 academic year (before the change of cycle, with the COVID-19 crisis and the awakening of GAI), a workshop on the digital economy and GTM for low-cost entrepreneurship with infoproducts has been taught. This workshop has been carried out with students from various Social Sciences degrees, who were taking basic economics subjects (i.e. Introduction to Economics in Economics, Principles of Economics in Communication, Political Economy and Public Finance in Law and Political Science). This proposal has been improved thanks to the use of GAI, thus adapting to the new cycle that has begun.

Working phases

GTM with infoproducts via GAI consists of a 3-phase, 9-milestone experiential training, to be developed as a collaborative group practice, based on an inverted classroom, active learning and gamification (since it is presented as a competition between startups). The dynamics followed consist of:

Phase 1: Mission Design:

a) Explain the task to the group of students in class: it is necessary to focus the students on the objectives to be achieved and their evaluation in each of its phases and milestones. Each milestone passed accumulates one tenth in the final grade, while a milestone not passed subtracts one tenth, and can be repeated until it is passed, with a neutral grade of zero). It must also be made clear to the students

that they can find a copy of the instructions on the virtual campus; other support materials will also be available, such as templates, samples from other editions, etc.

b) Organize the groups: between 3 and 5 students, avoiding the criterion of comfort based on physical proximity - the selection of the partner at the next table, instead of seeking diversity and talent. Instead, the convenience of the diversity sought (gender, age, nationality or region, abilities, etc.) must be made clear. Although there may be a division of tasks, then they must be shared and everyone is responsible for any milestone, thus avoiding the phenomenon of the free-rider or scrounger.

c) Combining talents to choose the infoproduct and its format: common tastes and hobbies are analyzed to focus on shared knowledge that can be used for the infoproduct and its format (a) text: blog, ebook, checklist, etc.; b) audio: audiobook, podcast, etc.; c) video: videoblog, webinar, course, etc.; d) mixed: community -free, registered and premium members-, events -competitions, parties or festivals-, etc.).

Among the first infoproducts were ebooks, podcasts and communities - because they were based on talent and did not require advanced computer knowledge-, having to use for distribution the free websites provided by social networks (i.e. Facebook, Instagram) and ecommerce platforms (i.e. Amazon, Hotmart, Shopify). Thanks to GAI it is now possible to offer own web pages with intuitive and no- code design or without the need for computer engineering knowledge (free, i.e. Webador, Webnode, Typeform, Webcreate.io; at one or two euros per month, i.e. Ionos, Shopify, Wix, Hostinger, Mailchimp), in addition to having chatbots or automated conversational assistants (i.e. HubSpot, Voiceflow, GPT Chat, GPT-3 Playground, YouChat), even apps or applications (i.e. Google Cloud, Wix, Jotform). Once the right infoproduct is found and it is proven to work, thanks to GAI more variants and add-ons can be offered, giving rise to a long-tail strategy of systematized and low-cost infoproducts.

Phase 2: Call to Action:

a) work and follow-up sessions: once the groups have been formed and the information product projects have been registered, time is set aside in the classroom to remember each milestone, its objectives and evaluation, and where the work materials are, so that they can start the task in class, to be completed outside the classroom.

b) group tutoring: the teacher goes through each group, asking them how they are doing and if they need help, giving them practical advice to move forward; there may be a check of the signatures of the students present and participating, as evidence of passing a milestone.

c) Sharing and preparing the defence: the members of each team must check that they have everything requested and rehearse the joint and interactive presentation.

For the brainstorming session, a 5-slide Power-point presentation was requested (a) presentation: image of the infoproduct and its format; b) tools: canva for the business plan –based on the value proposition-, SWOT for the project, buyer

persona to automate advertising for the recipient, etc.; c) monetization: web, social networks, ecommerce platforms and affiliates). The project was completed with a 1-minute advertisement with any free video editor (i.e. Canva, Powtoons, iMovie, Vimeo). Therefore, each group had to defend a two-minute live presentation and then the one-minute advertisement with the most important content (and all possible free effects). With GAI and the appropriate prompts, they can now automatically make presentations (i.e. Simplified, Smallppt, Slidesgo, Gamma) and videos (i.e. InVideo, Flexclip, Presentory, Pictory). Thanks to GAI it is possible to think about the original design and let the programs do the work, so you only have to review and add emotion and differentiation to the information product and the final defense.

Phase 3: Evaluation of the infoproduct:

a) Rally formula: the groups follow a given order – registration, alphanumeric, draw – with one group always making the presentation and another ready to take their place; while feedback is given to the first group, the next one uploads its presentation, thus saving time and in a single session there is time to make all the defenses.

b) Measuring time and confirming milestones: the teacher is in charge of timing and each group has two minutes for their interactive group presentation, with questions and answers, and no member can speak for more than thirty consecutive seconds. The video is then viewed, receiving feedback and clarifying whether all the milestones have been exceeded or whether any must be repeated to avoid receiving a negative grade. With respect to time, falling short or exceeding the given time by more than ten seconds means that the milestone has not been achieved, and it must be repeated –except for the live presentation.

c) Effectiveness voting: after each defense, the rest of the classmates vote by show of hands or via secret electronic means (i.e. Typeform, Doodle, Ferendum; the interest aroused by the information product is evaluated).

If all the milestones are exceeded, the grade must be nine-tenths (0.9), reaching the point thanks to the tenth of the presentation (to be communicated by the teacher in the feedback, during the rally defense). In turn, thanks to the votes of classmates, it is possible to establish a podium with extra rewards: the group (or groups) with the most votes will receive three extra tenths, appearing on the list to be published on the virtual campus in the gold category; the next group (or groups) in votes will appear in the silver category; and the third best vote will be in the bronze category.

Conclusions

Currently, thanks to digital talent (GTM), it is possible to start a business with almost no costs, by recycling the knowledge and tools already available (i.e. mobile, laptop, open Wi-Fi or wireless connection), which means that it is more respectful of the SDGs (i.e. less waste, more efficiency, greater access for all). In addition, thanks to GAI, it is now possible to offer better quality infoproducts, faster

and more efficient, and multimodal (for various devices, platforms, apps, etc.), as well as being no- code (not requiring deep computer knowledge, but just the aforementioned digital talent). In this way, it is now possible to offer personal and customized designs, such as posters, stickers, album covers, logos, etc., using GAI already incorporated into the latest generation of e-commerce platforms (i.e. Fiverr, Etsy), so that you work once to receive recurring income from all over the World.

During the various editions carried out between the different groups and comparing their results, it can be concluded that this is a successful practice because: The development of digital talent is encouraged, enabling entrepreneurship with information products; students learn to work as a team, collaborating and assuming responsibilities, as well as learning to celebrate successes together; students are trained to earn a living, without taking risks and instead recycling their knowledge and available tools, offering solutions to detected problems or improvements in experiences, all of which are enhanced by GAI; students learn by doing, thereby creating lasting memories that give them confidence and encourage them to take action.

In addition, to achieving the main objective, which is to train students, turning them from digital natives into digital entrepreneurs with infoproducts enhanced by GAI, thus increasing their productivity and profitability (with recurring income for a single systematized action). Students have also been made aware of the practical observation of the SDGs (since with this type of entrepreneurship discrimination and job insecurity are reduced, recycling and the relationship with the environment are improved, etc.): by becoming digital entrepreneurs they only need their talent and the recycling of their knowledge to design personalized experiences with minimal marginal cost thanks to GAI, so the accumulated marginal income facilitates access to financial freedom. In addition, on the side of the teaching staff, a greater interest in the subject has been achieved by the students, participating more in class and valuing better what they have learned through practice, which leads to better evaluations of teaching quality. For the members of GESCE, GID TIC-TAC CCEE, GID IODSEAE and CIELO-ESIC, they obtained letters of recognition and congratulations from the Rectorate for good and innovative teaching practices. All this is mentioned because, with the instructions in this publication, the GTM workshop for infoproducts and GAI can be replicated with similar results in other universities and countries (in addition, the authors are available to provide complementary materials for readers interested).

This practice aims to contribute to the consolidation of this teaching innovation tool applied to digital entrepreneurship (as well as many other possibilities it offers to improve the learning experience with digitalization). However, the aspiration of this systematizing and disseminating work was limited to presenting this practice, after a decade of experimentation in the classroom and with its continuous expansion in centers and Degrees (where it is carried out), in addition to content (moving from conventional entrepreneurship to i-entrepreneurship thanks to GAI). However, its limitations are known, so the commitment is assumed as future lines of research to offer a quantitative study with specific data (which currently cannot be shared, pending approval by the URJC ethics committee). Likewise, it is intended to continue advancing in the content and improvement of the experience, introducing for this purpose the rubric to be

implemented in the peer evaluation for future editions.

References

Barroso, L.R., & Barroso, L.V. (2023). Democracy, Social Media, and Freedom of Expression: Hate, Lies, and the Search for the Possible Truth. *Chi. J. Int'l L.*, *24*, 51. https://chicagounbound.uchicago.edu/cjil/vol24/iss1/3/

Boettke, P., Haeffele-Balch, S., & Storr, V. (2016). *Mainline Economics*. Mercatus Center Mainline Economics | Mercatus Center

Cardeño Portela, N., Cardeño Portela, E. J., & Bonilla Blanchar, E. (2023). TIC y transformación académica en las universidades. *Región Científica*, 2(2), 202370. https://doi.org/10.58763/rc202370

Corduneanu, A. (2020). Austrian Economics and its idiosyncartic ideas for the digital age. *Revista Economică*, *72*(2), 8-18. http://economice.ulbsibiu.ro/revista.economica/archive/72201cordunean u.pdf

Dobrowolski, Z. (2020). After COVID-19: reorientation of crisis management in crisis. *Entrepreneurship and Sustainability Issues*, *8*(2). https://doi.org/10.9770/jesi.2020.8.2(48)

Draghi, M. (2024). *The future of Europe competitiveness: A competitiveness strategy for Europe*. Brussels: European Commission. https://policycommons.net/artifacts/16410847/untitled/17295597/

Esteve-Mon, F. M., Llopis-Nebot, M. Á., & Adell-Segura, J. (2020). Digital teaching competence of university teachers: A systematic review of the literature. *IEEE revista Iberoamericana de Tecnologías del aprendizaje*, *15*(4), 399-406. https://doi.org/10.1109/RITA.2020.3033225

EU-Consilium. (2019a). *The Economy of Wellbeing: going beyond the GDP*. https://www.consilium.europa.eu/en/infographics/economy-wellbeing/

EU-Consilium. (2019b). *The Economy of Well-Being - Executive Summary of the OECD Background Paper on "Creating opportunities for people's well-being and economic growth"*. doc. 10414/18 ADD 1 https://data.consilium.europa.eu/doc/document/ST-10414-2019-INIT/en/pdf

Felicetti, A. M., Corvello, V., & Ammirato, S. (2024). Digital innovation in entrepreneurial firms: a systematic literature review. *Review of Managerial Science*, *18*(2), 315-362. https://doi.org/10.1007/s11846-023-00638-9

Figueiredo, V., & Ribeiro, S. (2022). Experiential learning in entrepreneurship education: A systematic literature review. *Teaching and Teacher Education*, 121, 103919, https://doi.org/10.1016/j.tate.2022.103919

Fuchs, C. (2015). *Culture and economy in the age of social media*. Routledge. Culture and Economy in the Age of Social Media | Christian Fuchs | Tay

(taylorfrancis.com)

Garzón, E., Martínez, T., Ortega, J., Marin, J., & Gomez, G. (2020). Teacher training in lifelong learning—The importance of digital competence in the encouragement of teaching innovation. *Sustainability*, *12*(7), 2852. https://doi.org/10.3390/su12072852

Gaus, G. (2020). A Branch on the Mainline: Hayek's Analysis of Complex Adaptive Systems. *Cosmos + Taxis*, *7*(5), 32-41. https://cosmosandtaxis.org/wp-content/uploads/2020/02/gaus_ct_vol7_iss5_6.pdf

Gavrila, S., & De Lucas, A. (2022). Entrepreneurship, innovation, digitization and digital transformation toward a sustainable growth within the pandemic environment. *International Journal of Entrepreneurial Behavior & Research*, *28*(1), 45-66. https://doi.org/10.1108/IJEBR-05-2021-0395

Gehrke, C. (2003). The Ricardo Effect: Its Meaning and Validity. *Economica,* 70 (277), 143–158. https://doi.org/10.1111/1468-0335.t01-1-00275

Gonzales, Y. M., Napoleón, L., y Pérez, A. J. (2023). Metaverso y educación: un espacio complejo para la próxima revolución educacional. *Metaverse Basic and Applied Research*, 2 (56), 1-10. https://doi.org/10.56294/mr202356

Guerra, D. D. D., Gamboa, A. J. P., & Cano, C. A. G. (2023). Social network analysis in virtual educational environments: Implications for collaborative learning and academic community development. *AWARI*, 4, 1–12. https://doi.org/10.47909/awari.595

Hausmann, R., & Hidalgo, C. (2014) *The Atlas of Economics Complexity. Mapping Paths to Prosperity*. MIT Press The Atlas of Economic Complexity: Mapping Paths to Prosperity | The Growth Lab (harvard.edu)

Hayek, F. (1935). Prices and Production. In Salerno J (ed.) *Prices and Production and Other Works*. Auburn: Mises Institute (2008).

Hayek, F. (1939). Profits, Interest, and Investment, and other Essays on the Theory of Industrial Fluctuations. In Hansjörg Klausinger (ed.) *The Collected Works of F.A. Hayek* (vol. 8, Business Cycles Part II, 2012).

Herman, E. (2022). The interplay between digital entrepreneurship and sustainable development in the context of the EU digital economy: A multivariate analysis. *Mathematics*, *10*(10), 1682. https://doi.org/10.3390/math10101682

Huarachi, D., Piekarski, C., Puglieri, F., & de Francisco, A. (2020). Past and future of Social Life Cycle Assessment: Historical evolution and research trends. *Journal of Cleaner Production*, *264*, 121506. https://doi.org/10.1016/j.jclepro.2020.121506

Hutchinson, C. S. (2022). Potential abuses of dominance by big tech through their use of Big Data and AI. *Journal of Antitrust Enforcement*, *10*(3), 443-468. https://doi.org/10.1093/jaenfo/jnac004

Jandrić, P., & Hayes, S. (2020). *Technological unemployment and its educational discontents. In Stocchetti, M. (ed.)*. The Digital Age and Its Discontents: Critical

Reflections in Education, Helsinki University Press, 161-182. https://doi.org/10.2307/j.ctv16c9hdw.13; https://www.jstor.org/stable/j.ctv16c9hdw.13

Jiménez-Pitre, I., Molina-Bolívar, G., & Gámez Pitre, R. (2023). Visión sistémica del contexto educativo tecnológico en Latinoamérica. *Región Científica*, 2(1), 202358. https://doi.org/10.58763/rc202358

Kaldor, N. (1942) Professor Hayek and the Concertina-Effect. *Economica*, 9(36), 359-382.

Keynes, J. (1930). *Economic Possibilities for our Grandchildren*. Macmillan.

Khanal, S., Zhang, H., & Taeihagh, A. (2024). Why and how is the power of Big Tech increasing in the policy process? The case of generative AI. *Policy and Society*, puae012. https://doi.org/10.1093/polsoc/puae012

Kolev, S. (2020). F. A. Hayek, Gemeinschaft and Gesellschaft, Globalization and Digitalization. *Cosmos + Taxis*, *7*(5), 42-49 COSMOS + TAXIS | Volume 7 Issue 5 + 6 2020 (cosmosandtaxis.org)

Kollmann, T., Kleine-Stegemann, L., de Cruppe, K., & Strauss, C. (2022). *Eras of digital entrepreneurship: connecting the past, present, and future. In Handbook of digital entrepreneurship* (p. 49-73). Edward Elgar Publishing. https://doi.org/10.4337/9781800373631.00009

Kuzior, A. (2022). Technological unemployment in the perspective of Industry 4.0. *Virtual Economics*, *5*(1), 7-23. https://doi.org/10.34021/ve.2022.05.01(1)

Lima, Y., Barbosa, C. E., dos Santos, H. S., & de Souza, J. M. (2021). Understanding technological unemployment: a review of causes, consequences, and solutions. *Societies*, *11*(2), 50. https://doi.org/10.3390/soc11020050

Liu, Z. (2022). *Principles of Digital Economics*. Springer Singapore. Principles of Digital Economics: Innovation Theory in the Age of Intelligence | SpringerLink

López González, Y. Y. (2023). Aptitud digital del profesorado frente a las competencias TIC en el siglo XXI: una evaluación de su desarrollo. *Región Científica*, 2(2), 2023119. https://doi.org/10.58763/rc2023119

Lv, B., Deng, Y., Meng, W., Wang, Z., & Tang, T. (2023). Research on digital intelligence business model based on artificial intelligence in post- epidemic era. *Management Decision*, 62(9): 2937-2957. https://doi.org/10.1108/MD-11-2022-1548

Mielants, E., & Bardos, K. (Eds.). (2020). *Economy Cycles and Social Movements: Past, Present and Future*. Routledge. Economic Cycles and Social Movements | Past, Present and Future | Eric (taylorfrancis.com)

Oloyede, A. A., Faruk, N., Noma, N., Tebepah, E., & Nwaulune, A. K. (2023). Measuring the impact of the digital economy in developing countries: A systematic review and meta-analysis. *Heliyon*, *9*(7). e17654. DOI:

https://doi.org/10.1016/j.heliyon.2023.e17654

Paul, J., Alhassan, I., Binsaif, N., & Singh, P. (2023). Digital entrepreneurship research: A systematic review. *Journal of Business Research*, *156*, 11350. https://doi.org/10.1016/j.jbusres.2022.113507

Pérez Gamboa, A. J., Gómez Cano, C. A., & Sánchez Castillo, V. (2022). Decision making in university contexts based on knowledge management systems. *Data and Metadata*, 1, 92. https://doi.org/10.56294/dm202292

Purnomo, A., Susanti, T., Sari, A. K., Firdaus, M., & Dewi, R. (2020). A study of digital entrepreneurship through bibliometric visualizing from 1993 to 2019. In *2020 International Conference on Information Management and Technology (ICIMTech)* (p. 911-915). IEEE. https://doi.org/10.1109/ICIMTech50083.2020.9211270

Sánchez-Bayón, A. (2021a). Balance de la economía digital ante la singularidad tecnológica. *Sociología y Tecnociencia*, 11(2), 53-80. https://doi.org/10.24197/st.Extra_2.2021.53-80

Sánchez-Bayón, A. (2021b). Una historia de las ciencias económicas desde sus raíces y disciplinas duales: de la hacendística y camerología a la economía aplicada y su giro hermenéutico. *Revista Facultad de Ciencias Económicas*, *29*(2), 87-103. https://doi.org/10.18359/rfce.5439

Sánchez-Bayón, A. (2022). Transición digital y reajuste del sector turístico en la Unión Europea. *Revista Internacional de Turismo, Empresa y Territorio-RITUREM*, 6(2), 1-24. https://doi.org/10.21071/riturem.v6i12.15049

Sánchez-Bayón, A. (2023). Análisis heterodoxo del sector turístico español pos-COVID: fallos en reajuste digital del empleo y vulnerabilidad empresarial, *Estudios Económicos*, 40(81), 223-252, https://doi.org/10.52292/j.estudecon.2023.3438

Sánchez-Bayón, A., Urbina, D., Alonso-Neira, M.A, & Arpi, R. (2023). Problema del conocimiento económico: revitalización de la disputa del método, análisis heterodoxo y claves de innovación docente. *Bajo Palabra*, (34), 117–140. https://doi.org/10.15366/bp2023.34.006

San-Martín, S., Jiménez, N., Rodríguez-Torrico, P., & Piñeiro-Ibarra, I. (2020). The determinants of teachers' continuance commitment to e-learning in higher education. *Education and Information Technologies*, *25*(4), 3205-3225. https://doi.org/10.1007/s10639-020-10117-3

Schirch, L. (Ed.). (2021). *Social media impacts on conflict and democracy: The techtonic shift*. Routledge. Social Media Impacts on Conflict and Democracy: The Techtonic Shift - (routledge.com)

Sharma, A., & Singh, B. J. (2020). Evolution of industrial revolutions: a review. *International Journal of Innovative Technology and Exploring Engineering*, *9*(11), 66-73. https://doi.org/10.35940/ijitee.I7144.0991120

Shaukat, S., Vishnumolakala, V. R., & Al Bustami, G. (2019). The impact of teachers' characteristics on their self-efficacy and job satisfaction: A perspective from

teachers engaging students with disabilities. *Journal of Research in Special Educational Needs, 19*(1), 68–76. https://doi.org/10.1111/1471-3802.12425

Siri, A., Supartha, I. W. G., Sukaatmadja, I. P. G., & Rahyuda, A. G. (2020). Does teacher competence and commitment improve teacher's professionalism. *Cogent Business & Management*, *7*(1), 1781993. https://doi.org/10.1080/23311975.2020.1781993

Sitaridis, I., & Kitsios, F. (2024). Digital entrepreneurship and entrepreneurship education: a review of the literature. *International Journal of Entrepreneurial Behavior & Research*, *30*(2/3), 277-304. https://doi.org/10.1108/IJEBR-01-2023-0053

Stan, R. S., Albert, C. N., Holonec, L., Simonca, V., Colisar, A., Rebreanu, F., & Sîngeorzan, S. (2021). Learning by doing–a method for practical activities. In *EDULEARN21 Proceedings* (p. 11032-11038). IATED. https://doi.org/10.21125/edulearn.2021.2288

Steininger, D. (2019). Linking information systems and entrepreneurship: A review and agenda for IT-associated and digital entrepreneurship research. *Information Systems Journal*, *29*(2), 363-407 https://doi.org/10.1111/isj.12206

Tominc, P., & Rožman, M. (2023). Artificial intelligence and business studies: study cycle differences regarding the perceptions of the key future competences. *Education Sciences*, *13*(6), 580. https://doi.org/10.3390/educsci13060580

Trongtorsak, S., Saraubon, K., & Nilsook, P. (2021). Collaborative Experiential Learning Process for Enhancing Digital Entrepreneurship. *Higher education studies*, *11*(1), 137-147. https://doi.org/10.5539/hes.v11n1p137

URJC. (2024). URJC en datos (URL: URJC data - Rey Juan Carlos University; accessed Nov. 2024).

Volti, R., & Croissant, J. (2024). *Society and technological change*. Waveland Press. Waveland Press - Society and Technological Change, Ninth Edition, by Rudi Volti, Jennifer Croissant

Von Briel, F., Selander, L., Hukal, P., Lehmann, J., Rothe, H., Fürstenau, D., & Wurm, B. (2021). Researching digital entrepreneurship: Current issues and suggestions for future directions. *Communications of the Association for Information Systems*, *48*, 284-304. https://doi.org/10.17705/1CAIS.04833

Wang, C. H., Padmanabhan, P., & Huang, C. H. (2022). The impacts of the 1997 Asian financial crisis and the 2008 global financial crisis on renewable energy consumption and carbon dioxide emissions for developed and developing countries. *Heliyon*, *8*(2). https://doi.org/10.1016/j.heliyon.2022.e08931

Wolff, J. (2021). How is technology changing the world, and how should the world change technology? *Global Perspectives*, *2*(1), 27353. https://doi.org/10.1525/gp.2021.27353

About the main author

Antonio Sánchez-Bayón: (PhD6: Law-UCM, Economics-UCM, Business-UMA, Sociology-UVA, Philosophy-UCM, Theology-UM & PhDc in Education-URJC) is Prof. Applied Economics at URJC (Spain). He has served as professor in Spain (a) universities: ICADE-UPCO or UCM; b) business schools: EAE Business School or ISEMCO; c) institutions: Colegio Prof. Politólogos, Chamber of Commerce) and visiting scholar at Harvard, DePaul or Baylor Univ. (USA), and in several Latin American universities. He counts with more than 25 years in teaching and research background, with more than 55 international articles (WoS and Scopus) and more than 45 books (SPI) in Comparative Political Economy (Austrian Economics, Anarchocapitalists, Culturalists and New-Institutional Economics). Cited more than 3,400 times and h-index 31. He collaborates with several publishers as academic editor, editorial board and reviewer (e.g. Retos(Ecuador), Energies, Semestre Económico, Economía & Negocios, Procesos de Mercado, JSTR). He has worked as a lawyer (ICAM, SIDH), consultant & business mentor (digitalization). Former Vice-Dean of Research at ISEMCO-UNIDAM, CEDEU-URJC, UCJC.

Declaration of author responsibility

Antonio Sánchez-Bayón 1: Conceptualization, Data Curation, Formal Analysis, Research, Methodology, Resources, Software, Supervision, Validation/Verification, Visualization, Writing/original draft, and Writing, review and editing.
Ana Belén Miquel-Burgos 2: Methodology, Software, Supervision, Validation/Verification, Writing/original draft and Writing, review and editing.
Miguel A. Alonso-Neira 3: Methodology, Software, Supervision, Validation/Verification, Writing/original draft and Writing, review and editing.

Special Acknowledgments: Acknowledgment: research supported by Consolidated research group for the Study and monitoring of the economic cycle of the Rey Juan Carlos University (GESCE-URJC), High-performance research group on Circularity, Sustainability, Innovation and Talent of the Rey Juan Carlos University (CIRSIT-URJC), Emerging Teaching Innovation Group in Information and Communication Technologies and learning and knowledge technologies for the improvement of studies in economics and the company (GID-TICTAC CCEESS-URJC), Emerging Teaching Innovation Group for the Incorporation of the SDGs in the Learning Experience in Economics (GID-ODS EAE) and CIELO ESIC Business & Marketing School.

Financing:

This research was carried out using our own resources.