DS4AIR

DIGITAL SKILLS
FOR THE AI REVOLUTION

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Contact Information
Coordinating Institution: B&P Emerging Technologies Consultancy Lab Ltd (Malta)
Email: mail@emtech-lab.com

Project Brief

The global workforce is today facing a critical period of jobs and skills instability. With a big portion of today's jobs set to disappear or become displaced by AI, robotics and automation, the world today requires a human workforce which possesses proficient digital skills. Pursuant to such predictions, the WEF has recently launched the 'Reskilling Revolution', aimed at providing better education, new skills and better work to a billion people by the year 2030. The DS4AIR project supports innovation through the design, development and evaluation of an online training course on Digital Skills in view of the Artificial Intelligence (AI) Revolution. This is aimed at improving and extending the reskilling of vulnerable adults in the workforce who possess a lower level of knowledge and digital competencies. Consequently, this will future-proof their careers vis-à-vis the anticipated shift and demands in digital skills.

In line with the WEF's initiative and as a proactive (rather than a reactive) measure, the project's objectives are:
- to establish the current state of affairs in the business industry in terms of AI readiness
- to identify the gaps between the required new digital skills and competencies and the demands of the labour market, in view of the Artificial Intelligence Revolution
- to create a learner persona defining the course's target audience
- to design and develop an online self-paced training course on digital skills for the Artificial Intelligence Revolution
- to reskill vulnerable adults whose jobs are threatened by the new technologies, hence ensuring their survival and prosperity in the job market
- to analyse the quality and impact (including the degree of satisfaction) of the course through a summative evaluation of the content and instructional design, vis-à-vis the expected learning outcomes
- to write a short recommendations document on digital skills for corporate training in the Artificial Intelligence Revolution

In terms of the project's expected impact, it is envisaged that the results will yield a high-quality digital learning environment, based on the needs and requirements of vulnerable adults in today's workforce. It is also expected that the digital competence of participating adults, will be enhanced, thus improving their careers prospects. Participating businesses will be equipped in terms of skilled labour to embrace the disruption brought about by emerging technologies and better placed to understand, assess and act upon the reskilling requirements posed by the foreseeable skills mismatch brought about by the Artificial Intelligence Revolution. In terms of the potential longer-term benefits, the online training course will become a valuable open education resource for re/upskilling for businesses and interested individuals around the world. Furthermore, the resulting recommendations document on digital skills for corporate training in the Artificial Intelligence Revolution will complement the Pan-European policy efforts in the popularisation of digital competencies, by providing evidence-based practice for future guidelines.

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1. Executive Summary

The Artificial Intelligence (AI) Revolution is transforming industries, economies, and individual lives, creating an urgent demand for digital skills tailored to this new era. The Digital Skills for the Artificial Intelligence Revolution (DS4AIR) project was initiated to address this need, by designing, developing and evaluating an online training course focusing on vulnerable adults who are at risk of being left behind in this technological shift. Through a multi-faceted approach, the project conducted an extensive literature review, needs analysis, and course evaluation. The literature review highlighted the importance of a harmonious collaboration between AI and humans, the essential AI-related digital skills, the changing nature of jobs due to AI, and the global emphasis on digital proficiency. The needs analysis revealed employers' readiness for AI adoption, challenges with data, resource allocation, and the digital skills of employees, especially older ones. The course evaluation indicated a positive reception of the course content and design, with suggestions for improvements.

Based on these insights, the recommendations section offers a roadmap for enhancing corporate training in the AI era. Key recommendations include fostering 'Collaborative Intelligence' between humans and AI, emphasising AI ethics, continuous upskilling, focusing on both technical and soft skills, offering personalised training paths, integrating practical examples, updating training based on feedback, emphasising digital proficiency, collaborating with industry experts, and ensuring accessibility and inclusivity in training programmes. These recommendations aim to bridge the digital skills gap and ensure a competitive workforce in the AI Revolution, aligning with Pan-European policy efforts and evidence-based practices.

2. Introduction

The dawn of the Artificial Intelligence (AI) Revolution has ushered in a transformative era, reshaping industries, economies, and individual lives. As AI technologies permeate various sectors, the demand for digital skills tailored to this revolution becomes paramount. Recognizing this imperative, the DS4AIR project was conceived and executed with a vision to bridge the digital skills gap, especially for vulnerable adults.

The project's core objective was to create an online training course that would cater to those who are at the crossroads of the AI Revolution, particularly the vulnerable adults who might feel left behind. These individuals, often overlooked in the rapid pace of technological advancements, require targeted upskilling and reskilling initiatives to ensure they remain relevant and empowered in the evolving job market.

This recommendations document seeks to provide a comprehensive overview of the project's journey, from its inception to its conclusion. Drawing insights from a detailed literature review and needs analysis, and a thorough post-course evaluation, the document aims to offer actionable recommendations. These recommendations are not just limited to the design, development, and evaluation of training courses on digital skills but also seek to complement Pan-European policy efforts, ensuring that the strategies are grounded in evidence-based practices.

3. Methodology

To ensure a comprehensive understanding and to derive actionable insights for the DS4AIR project, a multi-pronged approach was adopted. This section outlines the primary sources of information and the methods employed to gather and analyse data.

Literature Review: An extensive review of existing literature was conducted to understand the broader landscape of European Frameworks for digital competences in order to identify and define the required digital skills and competences in view of the Artificial Intelligence Revolution.

Needs Analysis: A targeted needs analysis was undertaken to identify the specific requirements of vulnerable adults in the context of the AI Revolution. This involved surveys and interviews with employers and employees. The aim was to determine the current state of affairs in the business industry concerning AI readiness, pinpoint the discrepancies between the required new digital skills and competencies and the demands of the labour market and consequently create a detailed learner persona that would define the target audience for the course. This analysis would subsequently guide the design and development of the online self-paced training course, targeting the reskilling and upskilling of vulnerable adults in terms of digital skills for the AI revolution.

Course Evaluation: Post the launch of the online training course, a rigorous evaluation was carried out. The aim was to capture feedback from candidates upon the completion of each chapter of the developed course. This feedback is intended to inform any future improvements of the course. The evaluation employed both quantitative and qualitative methods, including end-of-chapter surveys and interviews with key stakeholders, to gather comprehensive feedback on the course content, structure, and relevance.

The insights derived from these methods form the foundation upon which the subsequent sections of this document are built.

4. Key Findings

The DS4AIR project embarked on a comprehensive exploration of the digital skills landscape, particularly in the context of the AI Revolution. Through an exhaustive literature review, a detailed needs analysis, and a rigorous course evaluation, several pivotal insights emerged. These key findings shed light on the current challenges, opportunities, and trends surrounding digital skills training. The following sections delve deeper into these discoveries, providing a foundation for the subsequent recommendations.

4.1 Literature Review

The main conclusions from the literature review can be summarised as follows:

(i)   Division of Labour Between AI and Humans: The future of decision-making processes will require a harmonious collaboration between AI and humans. Colson (2019) proposed a model where humans don't directly interface with the vast amount of data available. Instead, they utilize Big Data and AI to suggest possible actions, with the final decision resting with the human. This approach necessitates a deep understanding of the possible actions, their prioritisation, evaluation, and ethical implications.

(ii)   Skills and Competencies in the AI Era: In the age of AI, it's essential to possess AI-related digital skills. The review identified the following: (i) AI literacy – the ability to learn and work with AI; (ii) AI ethics or character – the ability to use AI safely, ethically, and for the benefit of society; (iii) AI skills – the ability to design and train AI, e.g. to be able to build an AI and create the necessary content required for its operation; (iv) AI-human interface – the ability to communicate and collaborate across man-machine interfaces, including clear definitions of the roles of each; and (v) AI problem-solving – the ability to critically review AI solutions to the benefit of the team, users, markets, and customers. These skills are and will be in high demand, and there's a pressing need to focus on them collaboratively. The term 'Collaborative Intelligence' is introduced by Wilson and Daugherty (2020), emphasising the potential of humans and AI working together. For a successful collaboration, humans need to adapt and approach tasks differently.

(iii) The Changing Nature of Jobs: The literature underscores the potential displacement of a significant number of jobs due to AI, robotics, and automation. However, it also highlights the emergence of new roles that will require a digitally proficient workforce. This shift necessitates a focus on both hard technology-related skills and soft human skills, with the latter being considered as competencies.

(iv) The Need for Digital Proficiency: The literature aligns with global initiatives and strategies, such as the World Economic Forum's 'Reskilling Revolution' and the UK Government's prediction that soon, 90% of jobs will require digital proficiency. This emphasises the urgency to address the digital skills gap and prepare the workforce for the AI Revolution.

These conclusions provide a comprehensive understanding of the current landscape of AI in the workforce and the necessary skills and competencies required to navigate this evolving domain.

4.2 Needs Analysis

The main conclusions from the needs analysis can be summarised as follows:

(i) Transformational and Technical Readiness: The survey results indicate that employers are generally prepared in terms of transformational and technical readiness for the adoption and implementation of AI. They recognize the transformative capabilities of AI and its potential benefits.

(ii) Challenges with Data: A significant challenge identified is the format, quality, and volume of data required for the successful adoption of AI. Many survey respondents highlighted this as a key obstacle.

(iii) Resource Allocation: There seems to be a lack of effective allocation of funds and resources to promote AI-powered projects. As a result, many organizations might not have the necessary hardware and human capital to undertake AI projects.

(iv) Organizational and Environmental Readiness: The organizational readiness of employers for the adoption, implementation, and promotion of AI appears to be insufficient. Additionally, the level of environmental readiness among employers towards the adoption and implementation of AI solutions is relatively low.

(v) Employee Digital Skills: The survey responses from employees revealed that a significant percentage (27.35%) of employees with post-secondary education have limited skillsets in digital content creation. This is especially pronounced among older employees (56 years and above), who showed lower digital content creation and problem-solving skills compared to their younger counterparts.

4.3 Course Evaluation

The main conclusions from the needs analysis can be summarised as follows:

(i) Overall Positive Feedback: The majority of candidates provided positive feedback on the course content and design. On average, 73% of participants rated the chapters 4 stars or more (out of 5). This suggests a strong agreement with the overall content and design of the course.

(ii) Chapter Feedback: Feedback from end-of-chapter surveys indicated that most chapters were rated highly by the candidates. The content was found to be relevant to their needs, engaging, and structured logically. The media used, such as videos and images, was found to enhance understanding. Moreover, the exercises were deemed helpful in checking learning.

(iii) Areas of Improvement: Some candidates found certain chapters to be overly theoretical with a lack of interactive content. There were suggestions for more visual aids, videos, and practical examples. Additionally, there were comments about the inconsistency in chapter lengths and the desire for more varied assignments rather than just tests.

(iv) Quiz Results: The course evaluation also provided insights into the performance of candidates in chapter quizzes. The pass rates for the chapters ranged from 65% to 78%, indicating that the majority of the candidates were able to grasp and retain the knowledge imparted in the course.

(v) Recommendations for Enhancement: Based on the feedback, several recommendations were made for the improvement of the course. These include:

- Incorporating less text and more visual aids and videos;

- Providing examples, tools, or practical cases with sector-specific context;

- Offering "how-to" manuals/guides for using AI; and

- Ensuring better user instructions and more repetition to aid recall.

5. Recommendations

The rapidly evolving landscape of AI necessitates a proactive approach to digital skills training, especially in the corporate sector. As AI technologies become increasingly integrated into various industries, there is a pressing need to ensure that the workforce is adequately equipped to navigate this new terrain. The DS4AIR project has provided valuable insights into the current state of digital skills training, the specific needs of vulnerable adults, and the effectiveness of the online training course developed. Drawing from these insights, this section presents a set of recommendations aimed at enhancing corporate training for emerging technologies, with a particular focus on digital skills for the AI Revolution. These recommendations also align with Pan-European policy efforts, emphasising evidence-based practices.

(i) Collaborative Intelligence Training

Given the emphasis on 'Collaborative Intelligence' where humans and AI work in tandem, corporate training programmes should focus on fostering this synergy. Training modules should be developed to teach employees how to effectively collaborate with AI tools, ensuring optimal decision-making and productivity.

(ii) Emphasise AI Ethics

With the increasing integration of AI in various sectors, ethical considerations become paramount. Training programmes should incorporate modules on AI ethics, ensuring that employees are equipped to use AI tools responsibly and ethically.

(iii) Continuous Upskilling

The dynamic nature of AI technologies necessitates continuous learning. Organisations should invest in regular upskilling programmes, ensuring that their workforce remains updated with the latest advancements in AI.

(iv) Focus on Soft Skills

While technical proficiency is essential, the importance of soft skills in the AI era cannot be understated. Training programmes should emphasise skills like critical thinking, problem-solving, and effective communication, ensuring a holistic approach to training.

(v) Personalised Training Paths

Recognising the diverse needs of employees, training programmes should offer personalised paths. Using AI-driven analytics, organisations can identify the specific training needs of individual employees and tailor courses accordingly.

(vi) Incorporate Practical Examples

To enhance the effectiveness of training, practical, industry-specific examples should be integrated. This ensures that employees can relate to the content and apply their learnings in real-world scenarios.

(vii) Feedback-Driven Iterations

Drawing from the course evaluation insights, training programmes should be regularly updated based on feedback. This ensures that the content remains relevant and addresses the evolving needs of the workforce.

(viii) Emphasise Digital Proficiency

Given the prediction that 90% of jobs will soon require digital proficiency, organisations should prioritise digital skills training, ensuring that their workforce is prepared for the future.

(ix) Collaborate with Industry Experts

To ensure that training programmes are aligned with industry standards, organisations should collaborate with AI experts and educators. This ensures that the content is both relevant and of high quality.

(x) Accessibility and Inclusivity

Training programmes should be designed to be accessible to all, including vulnerable adults. This ensures that no segment of the workforce is left behind in the AI Revolution.

The AI Revolution presents both challenges and opportunities. By adopting a proactive approach to digital skills training, organisations can ensure that their workforce is well-equipped to navigate this new terrain. The recommendations presented in this document provide a roadmap for organisations, guiding them in their efforts to enhance digital skills training in the context of the AI Revolution. By implementing these recommendations, organisations can not only bridge the digital skills gap but also ensure that their workforce remains competitive in the rapidly evolving job market.

6. References

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