

An 871 Response Survey Dataset on Public Perceptions of Education for Sustainable Development, Digital Competencies, and Industry 4.0

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Abstract: The progressive integration of digital technologies into education, together with the rising policy salience of sustainable development, has intensified the demand for datasets capable of sustaining interdisciplinary educational research. This paper presents a structured survey dataset documenting public perceptions of the relationships among Education for Sustainable Development (ESD), digital competencies, and the Fourth Industrial Revolution (Industry 4.0). Data were collected through an online questionnaire administered over seven consecutive days, yielding 871 valid responses and a curated dataset of 34 variables. These variables cover demographic characteristics, educational background, digital competencies, sustainability awareness, and perceptions of technology supported learning and sustainable development. The dataset combines categorical, binary, ordinal, and Likert scale measures, accommodating descriptive, correlational, multivariate, and predictive analyses. Its interdisciplinary scope and standardized coding make it a reusable resource for researchers, educators, and policymakers concerned with digital transformation, sustainability education, and educational innovation. The dataset further supports secondary analysis, cross national comparison, and the empirical validation of theoretical models linking ESD to Industry 4.0.

Keywords: Fourth Industrial Revolution, Education for Sustainable Development, digital technologies, public perceptions, sustainable development.

1. Introduction

Sustainable development has become one of the principal priorities of governments, educational institutions, and organizations worldwide. The rapid advancement of digital technologies associated with the Fourth Industrial Revolution (Industry 4.0) (Popović, 2020) has substantially transformed educational environments, professional competencies, and workforce requirements. Digital literacy, technological skill, and sustainability awareness have accordingly emerged as complementary dimensions shaping both educational practice and organizational development. Education occupies a pivotal position in preparing individuals to confront the social, environmental, and economic challenges of sustainable development (Li et al., 2017; Schwab, 2016), while the incorporation of digital technologies into teaching and learning strengthens the capacity of learners to acquire, evaluate, and apply knowledge. Understanding how individuals perceive the relationship between digital competencies, education, and sustainable development is therefore essential for educators, researchers, and policymakers engaged in the design of evidence informed educational strategies.

The dataset presented here was developed to examine public perceptions of the contribution that education makes to sustainable development under the conditions of Industry 4.0. It permits the examination of multiple relationships among educational background, professional status, digital skill, sustainability awareness, and attitudes towards technology supported learning. The dataset is intended to serve researchers in education, sustainability, digital transformation, educational technology, and the social sciences by supplying openly structured survey data suitable for statistical analysis, hypothesis testing, and comparative international research. Where existing datasets address sustainability awareness or digital literacy in isolation, the present dataset integrates demographic characteristics, educational background, digital

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competencies, sustainability awareness, perceptions of Industry 4.0 (Tsakanikas & Athanassoulis, 2019), and educational attitudes within a single survey instrument. This integrated structure supports interdisciplinary analyses that remain unavailable to datasets addressing these domains independently.

Education for Sustainable Development (ESD) supplies the conceptual framework that connects the principal dimensions represented in this dataset. Alongside promoting knowledge of environmental, social, and economic sustainability, ESD emphasizes the competencies that allow individuals to evaluate emerging technologies critically, adapt to rapidly evolving labor markets, and contribute actively to sustainable societies. Digital competencies and Industry 4.0 (Wan et al., 2015) are therefore best understood as complementary elements supporting the achievement of sustainable development goals through education. By combining these dimensions within one survey instrument, the dataset allows researchers to investigate how demographic characteristics, educational background, digital competencies (Daniel, 2020), sustainability awareness, and perceptions of Industry 4.0 jointly shape public attitudes towards ESD. The dataset accordingly constitutes an interdisciplinary resource for future research at the intersection of education, digital transformation, and sustainability.

2. Value of the Data

This dataset offers a reusable resource for researchers examining the interplay between digital transformation, sustainability education, and public perception through standardized survey data. It provides comprehensive information on public perceptions of the relationship between education, digital competencies, Industry 4.0, and sustainable development. The data allow associations to be traced between demographic characteristics, educational attainment, digital literacy, sustainability awareness, and attitudes towards technology supported education across a wide range of statistical approaches. The integrated structure of the dataset permits interactions among educational, technological, and sustainability related variables to be investigated within a single analytical framework.

The dataset comprises responses from 871 participants across 34 variables, an extent sufficient for multivariate analysis, hypothesis testing, educational modelling, and comparative study. Researchers in education, sustainability science, digital transformation, educational technology, and the social sciences may reuse these data to validate theoretical frameworks, compare findings across countries, or examine emerging relationships between digital competencies and ESD. The dataset may equally assist policymakers and educational institutions in assessing public awareness of sustainable development and in designing educational interventions that align digital competencies with sustainability objectives.

3. Data Description

The survey was disseminated through social media platforms over a data collection window of seven days and produced 871 fully completed questionnaires, a figure that substantially exceeded the initial recruitment target of 150 participants. Following data cleaning, six questionnaire items were excluded from the final dataset, leaving 34 variables available for analysis. The retained variables encompass demographic characteristics, educational background, occupation, digital skill, awareness of sustainable development, familiarity with Industry 4.0 concepts, and the perceptions of respondents concerning the role of education and digital competencies in advancing sustainable development.

The dataset combines categorical, ordinal, and Likert scale variables. Demographic variables describe participant characteristics, whereas perception based variables record the opinions of respondents, and individual items may be analyzed separately or in combination to investigate relationships between educational attainment, occupation, computer literacy, sustainability awareness, digital competencies, and attitudes towards the integration of sustainability principles into educational systems and organizational practice. The dataset therefore supports descriptive statistics, correlation analysis, contingency analysis, regression modelling, exploratory factor analysis, structural equation modelling, and further multivariate techniques (Vardopoulos & Salvati, 2026).

The dataset has been organized to facilitate reuse by researchers working in education, sustainability, digital transformation, the social sciences, and public policy. Variable coding has been standardized to simplify statistical processing in commonly adopted software packages, among them SPSS, R, Python, and Stata. The questionnaire was designed to support the investigation of multiple relationships among demographic characteristics, digital competencies, educational practice,

sustainability awareness, and perceptions of Industry 4.0, which allows researchers to formulate and test a broad range of hypotheses using diverse statistical methodologies.

4. Experimental Design, Materials and Methods

4.1. Study Design

The dataset was developed through a quantitative cross sectional survey designed to examine public perceptions of sustainable development, digital competencies, education, and Industry 4.0. A structured online questionnaire was selected as the primary instrument because it permitted the efficient acquisition of standardized responses (Beiske, 2007) from a comparatively large number of participants within a limited period. The study captured the perceptions of participants at a single point in time and therefore provides a snapshot of prevailing attitudes towards sustainability related educational issues and digital transformation. The conceptual framework of the questionnaire was established following an extensive review of the literature on sustainable development, ESD, Industry 4.0, and digital competencies (Lambropoulos, 2019; Paraskevopoulos, 1999). That review guided the identification of the principal research dimensions and ensured that the instrument adequately represented the constructs relevant to the study objectives.

4.2. Questionnaire Development

The questionnaire was designed to collect primary data on the interaction between education, sustainable development, and digital transformation. Particular attention was given during its development to question clarity, logical sequencing, and respondent comprehension, so as to maximize response quality and minimize ambiguity across an instrument intended to address several research questions (Chawla & Sondhi, 2011). The questionnaire was reviewed prior to dissemination to confirm clarity, logical flow, and internal consistency of the items. It initially comprised 40 items organized into thematic sections. Following data screening and preparation for publication, six variables were excluded, leaving the 34 variables that constitute the published dataset. These variables describe demographic characteristics, educational background, computer literacy, awareness of sustainable development, perceptions of Industry 4.0, digital competencies, and attitudes towards sustainability oriented educational practice. Response formats varied according to the nature of each construct. Demographic information was collected through categorical response options, whereas perceptions and attitudes were measured primarily on 5-point Likert scales ranging from strong disagreement to strong agreement, or from very unlikely to very likely, depending on the corresponding item. This design accommodates both descriptive and inferential analysis.

4.3. Sampling Strategy and Data Collection

A convenience sampling approach was adopted given the exploratory nature of the study and the objective of assembling a sufficiently large dataset within a limited collection period. The questionnaire was distributed online through social media platforms and allowed voluntary participation by individuals with Internet access. Data collection remained open for seven consecutive days. The initial target was set at 150 completed questionnaires, and the survey ultimately received 871 valid responses, substantially exceeding the anticipated sample size. The resulting dataset supports a broad range of statistical analyses while carrying the limitations inherent in nonprobability sampling. Because participation was voluntary and Internet based, the dataset is best treated as a source for exploratory, correlational, and comparative research rather than as a statistically representative account of the general population (Henry, 1990; Lambropoulos, 2019).

4.4. Data Preparation and Structure

All questionnaire responses were reviewed for completeness and consistency once data collection had closed. Variables were assigned standardized codes suitable for statistical processing and organized into a structured spreadsheet format to facilitate reuse by other researchers. The final dataset contains 34 variables describing participant demographics, educational characteristics, digital competencies, sustainability awareness, and attitudes towards education and sustainable development. Variable coding was designed to ensure compatibility with widely used statistical software and thereby to support reproducibility and secondary analysis (Boynton & Greenhalgh, 2004; Lambropoulos, 2019). The dataset consists

predominantly of categorical and ordinal variables, which enables analysis through contingency tables, nonparametric methods, regression modelling, multivariate techniques, and, where appropriate, machine learning applications.

5. Dataset Structure

The published dataset contains 34 variables organized into six thematic domains describing the demographic characteristics, educational background, digital competencies, and sustainability awareness of respondents, together with their perceptions of the role of education and Industry 4.0 in achieving sustainable development. As shown in Table 1, this thematic organization facilitates descriptive and multivariate analysis alike and allows researchers to investigate relationships among individual characteristics, educational experience, digital literacy, and sustainability related attitudes.

Table 1. Thematic organization of the dataset

Dataset domain	Variables	Description
Demographic characteristics	Q1–Q6	Gender, family status, age, area of residence, educational attainment and occupation
Pandemic and educational background	Q7–Q17	Effects of the COVID-19 pandemic on future plans, computer literacy certification, awareness of sustainable development and Industry 4.0, lifelong learning and participation in training programs
Digital competencies and technology use	Q18–Q24	Self-perceived digital competencies, technology supported learning, Internet use for education, and educational computer use
Sustainability related behavior	Q25–Q29	Transportation habits, sustainable consumption, organizational sustainability practices, and sustainability training
Education for Sustainable Development (ESD)	Q30–Q32	Attitudes toward integrating sustainable development into secondary and higher education curricula
Industry 4.0 and Sustainable Development	Q33–Q34	Perceived contribution of digital competencies and Industry 4.0 to sustainable development

This organization enables each thematic block to be analyzed independently or interactions across domains to be examined. Demographic variables may be related to the digital competencies of respondents, for instance, while educational background may be examined against sustainability awareness or attitudes towards curriculum development. Table 2 provides a detailed description of all variables included in the dataset, together with their measurement type and scale.

Table 2. Description of the variables included in the dataset

Variable	Domain	Measurement	Scale
Q1	Gender	Categorical	Nominal
Q2	Family status	Categorical	Nominal
Q3	Age group	Ordinal	Ordered
Q4	Area of residence	Categorical	Nominal
Q5	Educational level	Ordinal	Ordered
Q6	Occupation	Categorical	Nominal
Q7	Pandemic effect on personal plans	Binary	Yes / No
Q8	Pandemic effect on professional plans	Binary	Yes / No
Q9	Pandemic effect on educational plans	Binary	Yes / No
Q10	Computer literacy certificate	Binary	Yes / No
Q11	Awareness of Sustainable Development	Binary	Yes / No
Q12	Awareness of Industry 4.0	Binary	Yes / No

Table 2. Continued

Variable	Domain	Measurement	Scale
Q13	Lifelong learning perception	Likert	5-point
Q14	Participation in training programs	Binary	Yes / No
Q15	Participation in Sustainable Development training	Binary	Yes / No
Q16	Awareness of digital skills in Industry 4.0	Binary	Yes / No
Q17	Training delivery mode	Categorical	Nominal
Q18–Q24	Digital competencies and technology use	Likert	5-point
Q25	Preferred transportation mode	Categorical	Nominal
Q26–Q27	Sustainability attitudes	Binary	Yes / No
Q28–Q33	Sustainability and education perceptions	Likert	5-point
Q34	Industry 4.0 contribution to Sustainable Development	Binary	Yes / No

6. Variable Coding Strategy

Several variables in the dataset were deliberately coded as binary, or dichotomous, in order to capture the presence or absence of characteristics, experiences, and knowledge relevant to the study objectives. These variables record whether participants possess particular attributes, among them awareness of sustainable development, familiarity with Industry 4.0 concepts, participation in educational programs, and certification in computer literacy, without measuring the intensity of opinion. Dichotomous coding offers several methodological advantages. It simplifies questionnaire completion and reduces respondent burden (Drennan, 2003), which improves response accuracy in large scale online surveys. It also facilitates the statistical analyses commonly employed in educational and social science research, including contingency table analysis, Chi square tests of independence, binary logistic regression, and classification modelling. Binary indicators can be readily combined with ordinal Likert scale variables (Stathakopoulos, 2005) in multivariate analyses relating objective participant characteristics to subjective perceptions. The dataset accordingly combines nominal, binary, ordinal, and Likert scale variables, providing flexibility across a broad spectrum of statistical methodologies while preserving the interpretability of individual questionnaire items. That combination increases the analytical versatility of the dataset while maintaining a balance between measurement simplicity and statistical robustness.

7. Potential Reuse of the Dataset

The dataset holds considerable potential for secondary analysis across multiple disciplines, among them education, sustainability science, digital transformation, educational technology, and public policy. Because the questionnaire integrates demographic information, educational characteristics, digital competencies, sustainability awareness, and perceptions of Industry 4.0 within a single framework, researchers may pursue a broad range of interdisciplinary questions without additional primary data collection. The data are particularly suited to comparative studies of public awareness of sustainable development and digital transformation across demographic groups, educational levels, occupational categories, and geographical regions. The dataset may also be used to validate existing theoretical models of ESD, digital literacy, technology acceptance, and lifelong learning.

Methodologically, the dataset supports descriptive statistics, contingency analysis, nonparametric hypothesis testing, regression modelling, exploratory and confirmatory factor analysis, structural equation modelling, and machine learning classification aimed at identifying latent patterns in the perceptions and educational characteristics of respondents (Vardopoulos & Salvati, 2026). Beyond academic research, the dataset may inform educational policymakers, curriculum developers, governmental agencies, and training organizations concerned with embedding sustainability principles and digital competencies within educational programs. Findings derived from it may contribute to the design of evidence informed educational policy that promotes sustainable development under the conditions of Industry 4.0.

The availability of both binary and ordinal variables further enables researchers to investigate complex interactions between objective participant characteristics and subjective perceptions, which facilitates reproducible analysis and encourages comparative studies using similar survey instruments.

References

- Beiske, B. (2007). *Research Methods. Uses and Limitations of Questionnaires, Interviews, and Case Studies*. Economy.
- Boynton, P. M., & Greenhalgh, T. (2004). Selecting, designing, and developing your questionnaire. *BMJ*, 328(7451), 1312–1315. <https://doi.org/10.1136/bmj.328.7451.1312>
- Chawla, D., & Sondhi, N. (2011). *Research Methodology*. New Delhi.
- Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, 49(1–2), 91–96. <https://doi.org/10.1007/s11125-020-09464-3>
- Drennan, J. (2003). Cognitive interviewing: Verbal data in the design and pretesting of questionnaires. *Journal of Advanced Nursing*, 42(1), 57–63. <https://doi.org/10.1046/j.1365-2648.2003.02579.x>
- Henry, G. T. (1990). *Practical Sampling*. Sage Publications.
- Lampropoulos, I. (2019). *Business Plan of a Company for the Expansion of the Activity of Selling Goods through Electronic Orders in a Branch of a Supermarket Company*. Open University of Cyprus.
- Li, G., Hou, Y., & Wu, A. (2017). Fourth Industrial Revolution: Technological drivers, impacts and coping methods. *Chinese Geographical Science*, 27(4), 626–637. <https://doi.org/10.1007/s11769-017-0890-x>
- Paraskevopoulos, I. (1999). *Interpersonal and Intrapersonal Adjustment Questionnaire*. Athens.
- Popović, A. (2020). Implications of the Fourth Industrial Revolution on sustainable development. *Economics of Sustainable Development*, 4(1), 45–60. <https://doi.org/10.5937/ESD2001045P>
- Schwab, K. (2016). *The Fourth Industrial Revolution*. World Economic Forum.
- Stathakopoulos, V. (2005). *Market Research Methods*. Athens.
- Tsakanikas, A., & Athanassoulis, N. T. (2019). Greece 4.0 towards sustainable development goals. In *Proceedings of the 12th Panhellenic Scientific Conference of Chemical Engineering*. Athens.
- Vardopoulos, I., & Salvati, L. (2026). *Statistica multidimensionale: applicazioni per l'economia, l'architettura e le scienze*. ISBN 9798195675202.
- Wan, J., Cai, H., & Zhou, K. (2015). Industrie 4.0: Enabling technologies. In *2014 International Conference on Intelligent Computing and Internet of Things (ICIT)*. IEEE.