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Report on modularisation of CEPD and micro-credentialing

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Executive Summary

This report, **Deliverable D5.3 – Report on the Modularization of CEPD and Micro-credentialing**, is a key output of **Work Package 5** (WP5) of the *Modular Continuing Higher Education by Micro-credentials (MCE)* project, co-funded by the Erasmus+ programme. MCE aims to support the transformation of European universities by integrating micro-credentials into their lifelong learning offerings, aligning these developments with learner needs, institutional strategies, and evolving European and national policy frameworks.

The overarching objective of WP5 is to **test modularization and micro-credentialing practices** through real-world pilots that reflect the diversity of institutional contexts and learner demands. Within this framework, **Task 5.3** specifically addresses the need to **monitor and evaluate stakeholder acceptance** of micro-credentials—one of the critical success factors for their sustainable uptake and institutional integration. This task contributes directly to the MCE project's ambition to create an evidence base for policy recommendations (WP6) and to support institutional development (WP3, WP4).

To that end, this report presents the **methodological approach, data collection tools, and key findings** from a large-scale evaluation involving 705 respondents across 22 pilot courses delivered by MCE partner institutions. Stakeholders included students, professors/course designers, higher education institution (HEI) managers, and external stakeholders (e.g., employers and professional organisations). The evaluation was structured around five core dimensions drawn from D5.1:

1. **Relative Advantage**
2. **Compatibility**
3. **Complexity**
4. **Trialability**
5. **Observability**

Each dimension was operationalised through validated survey items and Likert-scale responses, ensuring consistency across stakeholder groups and institutions. Data were collected with either the Millisecond Inquisit platform or other GDPR-compliant tools to guarantee methodological robustness and compliance with data protection regulations.

Key Findings

- **Micro-credentials are broadly well-received** across all dimensions, with particularly high scores for **Trialability** (M = 3.93) and **Complexity** (M = 3.92), indicating that stakeholders find micro-credentials easy to experiment with and not overly burdensome to implement or follow.
- **Observability** emerged as the weakest dimension (M = 3.21), suggesting that the benefits of micro-credentials—such as career advancement or increased employability—are not yet clearly visible to all stakeholders, especially students. This aligns with MCE's broader objective to enhance the visibility and recognition of micro-credentials within qualifications frameworks and labour markets.
- **Students consistently rated micro-credentials lower** than other stakeholder groups in the dimensions of **Relative Advantage**, **Compatibility**, and **Observability**, indicating a more cautious or uncertain stance regarding their usefulness and alignment with their learning and career trajectories. This underscores the importance of stronger

communication strategies and learner support mechanisms, a key theme of WP2 and WP3.

- In contrast, **professors and HEI managers** reported higher levels of agreement regarding the **Relative Advantage** of micro-credentials, recognizing their potential for teaching innovation, institutional positioning, and responsiveness to labour market needs.
- **External stakeholders**, while generally positive, perceived **higher complexity** (e.g. integration into internal systems, selection processes), which suggests that more efforts are needed to streamline collaboration with industry partners—a core goal of the MCE's multi-stakeholder approach.
- A **Repeated Measures ANOVA** confirmed statistically significant differences across the five dimensions, with **Observability** scoring consistently and significantly lower.
- **Correlation analyses** showed strong links between **Relative Advantage and Compatibility** ($r = .66$), suggesting that when micro-credentials are perceived as beneficial, they are also more likely to be seen as fitting into existing learning or institutional frameworks. In contrast, the links between Observability and other dimensions were weaker, reinforcing the challenge of demonstrating clear outcomes.
- **Demographic analyses** found no significant differences in acceptance by gender or age, although PhD holders rated **Observability** higher, perhaps due to greater familiarity with credentialing systems and educational innovation.

These findings provide essential insights for the MCE project and the wider European Higher Education Area. They highlight both the **potential of micro-credentials to serve as flexible, learner-centred formats** for CEPD and the **challenges that must be addressed** to fully realise their promise—particularly in making their benefits more tangible and visible to students and employers alike.

Contribution to the MCE Project

Deliverable D5.3 makes a substantial contribution to MCE's impact-oriented methodology by generating actionable evidence that will:

- Gather more evidence to better understand learners' perspectives on micro-credentials (WP2)
- Inform the design and refinement of future pilots and microc-redential programmes (WP5),
- Support the conceptualisation of the key outcomes of the institutional seminars aimed at fostering systemic change and the models and guidelines for the institutional design, development of micro-credentials (WP4),
- Support the development of learner-centred policies and services (WP3),
- Provide concrete data for national and EU-level policy dialogues on micro-credentials and CEPD frameworks (WP6).

In line with MCE's multi-level, multi-stakeholder model, this deliverable strengthens the foundation for transformation by anchoring institutional decisions in empirical data and stakeholder feedback. It serves as both a benchmark and a roadmap for universities, policymakers, and industry partners aiming to harness micro-credentials for more accessible, inclusive, and future-ready higher education in Europe.

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Introduction

This document reports on task 5.3 that includes continuously assessing the impact of micro-credentials on learners, teaching staff and teaching support services (design, development and delivery), university leadership and institutions (institutional organization and conditions) (input for on-site institutional seminars, WP3). It also considers the continuously assessing of the impact for CEPD policies (input evidence-based policy recommendations, WP6). All outcomes mentioned in this report are based on the case studies and pilots carried out by project partners. More specifically this deliverable (5.3) investigates the impact of micro-credentials on learners, teaching staff and teaching support services (design, development and delivery), university leadership and institutions (institutional organization and conditions), collaboration with external stakeholders, (input for on-site institutional seminars, WP3).

Methodology

Procedure

Data collection was conducted using a structured online survey methodology targeting four distinct groups: students, professors, Higher Education Institution (HEI) managers, and external stakeholders. Each group was provided access to its respective questionnaire through dedicated, parallel survey links hosted on the Millisecond Inquisit platform. Millisecond Inquisit, a specialized data collection software widely used for psychological testing, usability assessments, and academic research, was selected due to its robustness and reliability in automating survey delivery, its cross-platform compatibility, and its capability to securely store collected data. The platform guaranteed compliance with European Union data protection regulations by securely hosting all collected data on servers located within the EU. Participants could access the survey using desktop computers (both Windows and Mac) or mobile devices. Partners were permitted to use comparable GDPR-compliant tools, provided that the methodological approach remained consistent, and the resulting data matrix was uniform.

Each questionnaire consisted of initial demographic questions (gender, age, educational qualification, and academic or professional role), followed by multiple statements assessing participants' perceptions of micro-credentials. Responses to these statements were measured using a standardized 5-point Likert scale, ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). Partners were explicitly instructed to maintain this standardized response format, even if alternative survey administration platforms were considered, to maintain consistency for subsequent comparative analyses. Prior to participation, respondents were presented with an integrated informed consent form, clearly outlining the study's objectives, data handling procedures, and their rights regarding confidentiality and voluntary participation. The system was designed to prevent respondents who did not explicitly agree to the consent terms before progressing further, to guarantee adherence to ethical research practices and data protection standards. Key outcome dimensions for evaluating micro-credentials

In evaluating micro-credentials, five key outcome dimensions are assessed to understand their effectiveness and alignment with stakeholders' needs: **Relative Advantage**, **Compatibility**, **Complexity**, **Trialability**, and **Observability**. These dimensions define the framework for analysing the adoption and impact of micro-credentials across various educational and professional contexts.

Relative Advantage

This dimension examines the perceived benefits of micro-credentials over traditional, longer programs. For students, it assesses whether micro-credentials offer more flexible learning opportunities, faster professional advancement (reskilling and upskilling), cost-effectiveness, and content relevance to market needs. For professors, it evaluates opportunities for teaching innovation, professional reputation enhancement, reaching diverse audiences, income generation, specialization in niche areas, and intellectual stimulation. HEI managers consider micro-credentials as strategies for competitive positioning, responsiveness to market needs, attractiveness to lifelong learners, diversification of offerings, new revenue streams, and curricular innovation. External stakeholders focus on micro-credentials' effectiveness in addressing skill gaps, facilitating rapid adaptation to market changes, upskilling and reskilling employees, aligning with business needs, offering their workforce targeted learning options, and enhacement for professional development.

Compatibility

This dimension assesses how well micro-credentials align with individual lifestyles, organizational cultures, and existing systems. For students, it considers alignment with job requirements, learning styles, professional commitments, personal life, educational values, and preferred assessment methods. Professors evaluate the fit of micro-credentials with their workload, teaching styles, institutional curriculum, technology platforms, teaching philosophies, and integration into existing educational systems. HEI managers examine the alignment of micro-credentials with institutional goals, infrastructure, mission, strengths, staff receptiveness, and long-term visions. External stakeholders assess how micro-credentials fit with organizational learning cultures, employee development needs, strategic objectives, existing training programs, industry demands, and talent development plans.

Complexity

This dimension evaluates the perceived simplicity and ease of use of micro-credentials. For students, it examines the user-friendliness of technology used for the online and/or remote offering of micro-credentials, clarity of course content, ease of navigation, straightforwardness/simplicity of credential requirements, accessibility of support resources, and simplicity of enrolment processes. Professors assess the ease of designing micro-credentials , adequacy of institutional and other support, adaptability of content, clarity of design standards, confidence in using technology, and manageability of student assessment processes. HEI managers consider the manageability and flexibility of designing and implementing micro-credentials, institutional capacity, clarity of regulatory aspects, adaptability to operational changes, staff understanding, and ease of integration into existing systems. External stakeholders evaluate the straightforwardness of understanding and utilizing micro-credentials, simplicity of collaboration processes, alignment and/or compatibility with internal training systems, manageability of integration logistics, user-friendliness of platforms, and ease of selecting relevant micro-credentials for employees.

Trialability

This dimension reflects the opportunity to experiment with micro-credential courses on a small scale before full commitment. For students, it includes the appeal of sampling courses, piloting them to gauge fit and determine suitability, flexibility to start with shorter courses, testing course relevance, and exploring subjects before specializing and committing. Professors value piloting courses for refinement, experimenting with teaching methods, gathering feedback from early iterations, testing content and teaching approaches, gauging student engagement, and adapting courses based on initial experiences. HEI managers consider piloting courses to test viability, flexibility in formats and subjects, assessing market demand, gaining insights for adjustments, refining offerings based on experiences, and testing impact in specific departments. External stakeholders evaluate piloting programs with partners, testing effectiveness in controlled settings, assessing employee engagement, experimenting with course subjects, and exploring flexibility in formats and durations.

Observability

This dimension pertains to the extent to which the benefits of micro-credentials are visible and measurable. For students, it involves visibility of career advancements, observable positive impacts on professional lives, inspiring success stories, well-documented job market advantages, growing recognition in professional networks, and tangible practical outcomes. Professors observe impacts on student skills and employability, evident student feedback and engagement, growing demand in academia, noticeable positive career outcomes, increasing interest from stakeholders, and clear benefits in enhancing educational offerings. HEI managers notice impacts on enrolment and engagement, success in meeting diverse learner needs, adoption by peer institutions, increased interest from students and partners, recognition of trends in higher education, and observable outcomes like enhanced employability. External stakeholders assess benefits such as improved employee performance, positive impacts on career development, measurable workforce skills development, growing professional acceptance, demonstrated effectiveness in meeting training needs, and visible outcomes in employees.

Sample description

The final sample consisted of 705 respondents. The mean age of participants was 50.60 years (SD = 12.27), with a median age of 53 years and an age range spanning from 19 to 88 years. The overall age distribution approximated normality, as indicated by a modest skewness (-0.37) and kurtosis (0.26). Gender representation was well balanced, with 354 males (50.2%), 343 females (48.6%), while a small proportion (1.1%) identified as non-binary or preferred not to disclose their gender. In terms of educational qualifications, the distribution was as follows: 232 respondents (33.6%) reported holding a Master’s degree; 136 respondents (19.7%) reported having a High School diploma; 124 respondents (18.0%) reported holding a Bachelor's degree; 111 respondents (16.1%) reported having a PhD; 44 respondents (6.4%) reported Vocational Training; 41 respondents (5.9%) reported holding an Associate Degree; 2

respondents (0.3%) reported a Middle School qualification; and no respondents reported having only Primary School education.

Reliability analysis

The internal consistency of the five evaluation scales was assessed using Cronbach's alpha (Cronbach, 1951) and McDonald's omega (McDonald, 1999). The **Relative Advantage** scale yielded a Cronbach's alpha of 0.80 and an omega of 0.97, indicating excellent internal consistency. Similarly, the **Compatibility** scale demonstrated an alpha of 0.83 and an omega of 0.89; the **Complexity** scale, an alpha of 0.85 and an omega of 0.89; the **Trialability** scale, an alpha of 0.87 and an omega of 0.91; and the **Observability** scale, an alpha of 0.90 and an omega of 0.93. These high reliability coefficients indicate that all five scales are both reliable and suitable for further inferential analysis.

Data Analysis

Descriptive statistics of outcome measures

First, descriptive analyses were conducted on the outcome measures to assess their central tendency and variability. The **Relative Advantage** scale (n = 703) showed a mean of 3.85 (SD = 0.67) and a median of 3.83, with a range of 4.00. The **Compatibility** scale (n = 702) had a mean of 3.91 (SD = 0.68), a median of 4.00, and a range of 4.33. The **Complexity** scale (n = 702) showed a mean of 3.92 (SD = 0.70), a median of 4.00, and a range of 5.00. The **Trialability** scale (n = 702) showed a mean of 3.93 (SD = 0.73), a median of 4.00, and a range of 4.00. Finally, the **Observability** scale (n = 702) yielded a mean of 3.21 (SD = 0.81), a median of 3.17, and a range of 4.00.

Table 1- Reliability and Descriptive Statistics for Outcome Measures

Measure	α	ω	M	SD	Median
Relative Advantage	0.80	0.97	3.85	0.67	3.83
Compatibility	0.83	0.89	3.91	0.68	4.00
Complexity	0.85	0.89	3.92	0.70	4.00
Trialability	0.87	0.91	3.93	0.73	4.00
Observability	0.90	0.93	3.21	0.81	3.17

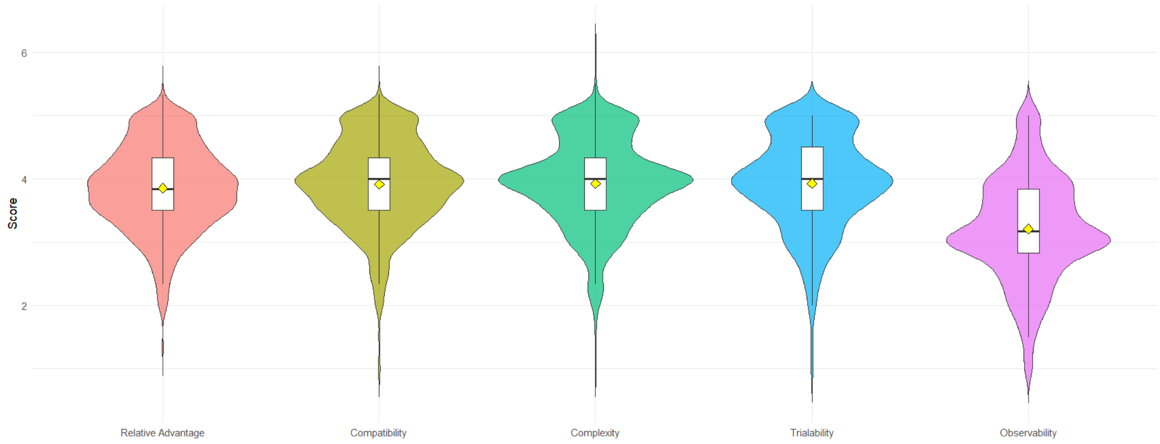

Figure 1- Reliability and Descriptive Statistics for Outcome Measures

Subgroup Comparisons: Gender and Educational Qualification

The sample was examined by subgroups to first assess any potential differences in the outcome measures across gender and educational qualification. Descriptive statistics for the key outcome variables, i.e., Relative Advantage, Compatibility, Complexity, Trialability, and Observability, were computed separately for each gender. For males, the **Relative Advantage** measure showed a mean of 3.82 (SD = 0.60), while for females the mean was 3.90 (SD = 0.71). Similarly, the **Compatibility** scores were 3.92 (SD = 0.63) for males versus 3.93 (SD = 0.71) for females. **Complexity** scores were comparable across groups, with means of 3.95 (SD = 0.66) for males and 3.92 (SD = 0.72) for females. In the case of **Trialability**, the male group showed a mean of 3.88 (SD = 0.70) compared to 3.99 (SD = 0.76) for females. **Observability** scores were 3.17 (SD = 0.79) for males and 3.26 (SD = 0.83) for females.

Thus, a cross-tabulation of gender by educational qualification was conducted to further explore subgroup differences (Table 2).

Table 2- Cross-tabulation of gender by educational qualification

	Primary S.	Middle S.	High S.	Vocat.Tr.	Ass.Deg.	Bachel.	Master's	PhD
M	0	1	87	18	15	54	114	58
F	0	1	49	26	26	69	114	51

Such contingency table shows that among male respondents, the predominant educational levels were High School (n = 87) and Master's (n = 114), with 58 PhD holders. Among females, High School qualifications were also common (n = 49), followed by Master's (n = 114) and PhD (n = 51). Vocational Training and Associate Degree levels were modestly represented, with 18 and 15 males and 26 and 26 females, respectively. Both genders had a minimal representation at the Middle School level (n = 1 each) and no respondents reported Primary School as their highest qualification.

Repeated Measures ANOVA

A repeated measures ANOVA was conducted to determine whether there were systematic differences in evaluations across the five micro-credential evaluative dimensions (Relative Advantage, Compatibility, Complexity, Trialability, and Observability). The analysis revealed a statistically significant effect of the evaluative dimension, $F(4, 2804) = 225.69$, $p < 0.001$, indicating that respondents' ratings differed across these dimensions. Mauchly's test of sphericity was significant ($W = 0.679$, $p < .001$), and thus Greenhouse-Geisser corrections were applied ($\varepsilon = 0.863$). Subsequent pairwise comparisons, adjusted using the Bonferroni method, showed that the **Observability** dimension was rated significantly lower than **Relative Advantage** (mean difference = 0.641, SE = 0.027, $t(701) = 23.59$, $p < .0001$), **Compatibility** (mean difference = 0.704, SE = 0.029, $t(701) = 24.21$, $p < .0001$), **Complexity** (mean difference = 0.716, SE = 0.034, $t(701) = 20.87$, $p < .0001$), and **Trialability** (mean difference = 0.718, SE = 0.033, $t(701) = 21.49$, $p < .0001$). In addition, **Relative Advantage** was rated slightly lower than **Compatibility** (mean difference = -0.063, SE = 0.021, $t(701) = -2.99$, $p = .0288$), while no other significant differences were observed among the remaining dimensions.

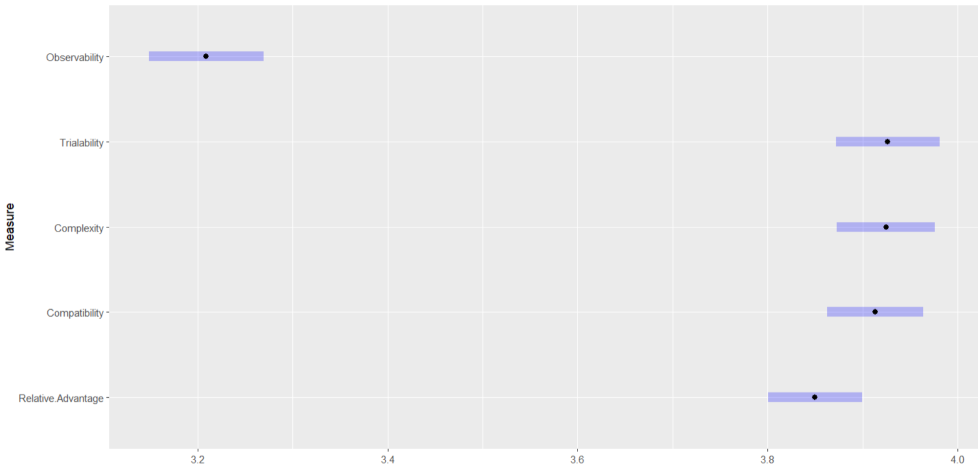

Figure 2 means comparison

Correlations between the five outcome measures

A correlation matrix (Pearson's r) was computed to determine the degree of association among Relative Advantage, Compatibility, Complexity, Trialability, and Observability to verify whether these dimensions represent highly correlated constructs or relatively independent assessments, as well as to examine the direction of their relationships. All pairwise correlations were positive and statistically significant at $p < .001$, with values ranging from $r = .23$ (Complexity and Trialability) to $r = .66$ (Relative Advantage and Compatibility). Relative Advantage demonstrated strong positive associations with both Compatibility ($r = .66$) and Observability ($r = .54$), suggesting that participants who perceived greater benefits of micro-credentials also tended to view them as well-aligned with their personal needs and readily visible in their impact. Similarly, Compatibility showed a moderate to strong relationship with Complexity (r = .57) and Observability (r = .48), indicating that respondents who found micro-credentials to fit well with their routines often viewed them as less difficult to use and more easily observed in their outcomes.

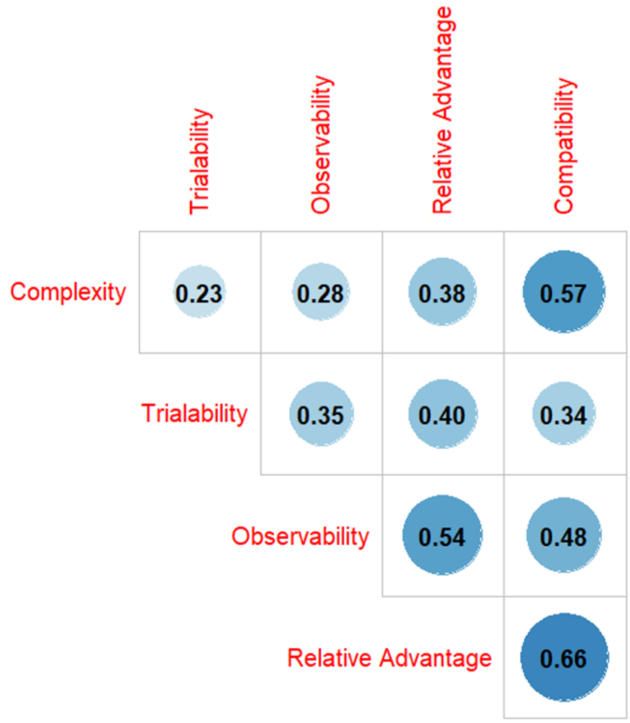

Figure 3 correlation between the four measures

Correlation between scores and age of respondent

A correlation analysis was conducted to assess the relationships between participants' age and each of the five micro-credential measures (Relative Advantage, Compatibility, Complexity, Trialability, and Observability). The results show that age demonstrated small but statistically significant negative correlations with Complexity ($r = -0.10$, $p = .03$) and Observability ($r = -0.11$, $p = .01$) after adjusting for multiple comparisons. In contrast, no significant associations were observed between age and the remaining dimensions, indicating that older respondents tended to view micro-credentials as slightly more complex and less observable, while their views on Relative Advantage, Compatibility, and Trialability did not differ meaningfully by age.

Scores by pilot groups

The overall evaluations of micro-credentials were thus examined, investigating whether differed significantly across the four pilot groups (Students, Professors, HEI Managers, and External Stakeholders). The following sections report one-way ANOVA results for each of the key measures, along with post hoc comparisons (where applicable).

Relative Advantage scores by pilot groups

A one-way ANOVA revealed a significant effect of pilot group on Relative Advantage scores, $F(3, 699) = 5.20$, $p = .001$. Post hoc Tukey comparisons indicated that Professors (M difference

= 0.235, p = .009) scored significantly higher than Students, while no other pairwise differences reached statistical significance. This indicates that Professors, on average, perceive a greater benefit of micro-credentials compared to Students.

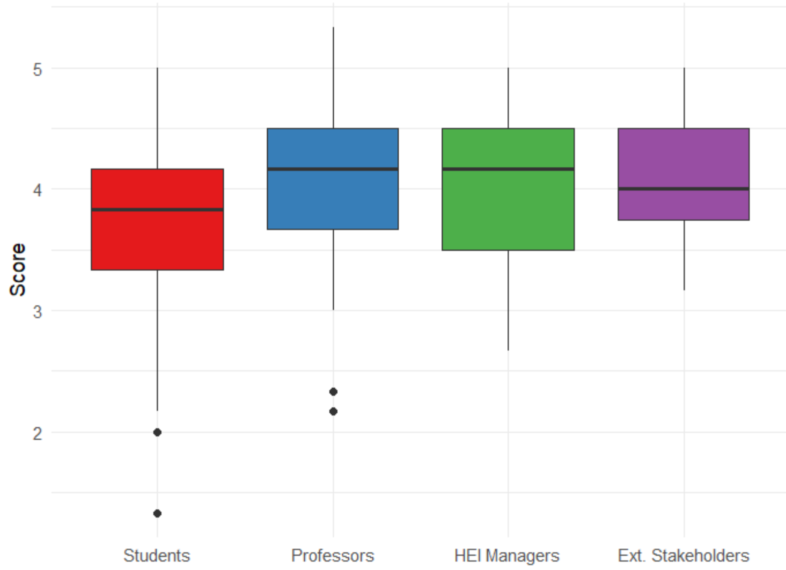

Figure 4 Pilots' scores

Compatibility scores by pilot groups

A one-way ANOVA showed no significant difference in Compatibility scores across the four pilot groups, $F(3, 698) = 1.84$, $p = .139$. Thus, respondents' assessments of how well micro-credentials fit with individual preferences and lifestyles appeared consistent across Students, Professors, HEI Managers, and External Stakeholders.

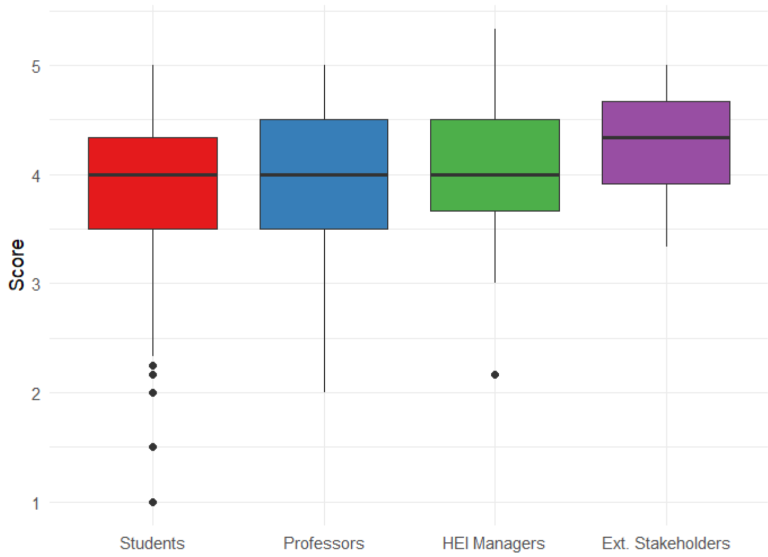

Figure 5- Compatibility scores by pilot groups

Complexity scores by pilot groups

A one-way ANOVA examining Complexity scores by pilot group revealed a significant effect, $F(3, 698) = 6.116$, $p < .001$. Tukey post hoc comparisons showed that Professors reported significantly lower Complexity than Students (mean difference = -0.302, $p < .001$), whereas External Stakeholders rated Complexity significantly higher than Professors (mean difference = 0.587, $p = .012$). No other comparisons reached significance, suggesting that Professors found micro-credentials more complex overall, while External Stakeholders perceived them as less complex relative to Professors (being a reversed index).

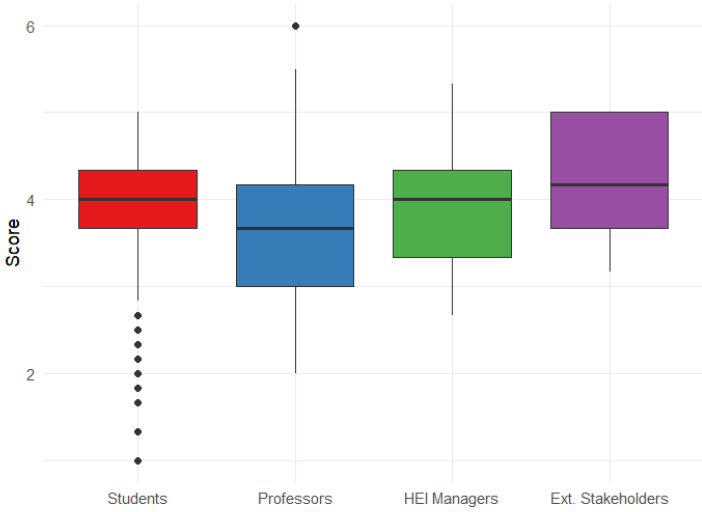

Figure 6- Complexity scores by pilot groups

Trialability scores by pilot group

A one-way ANOVA indicated a significant difference in Trialability scores among the four pilot groups, $F(3, 698) = 4.887$, $p = .002$. Tukey post hoc tests revealed that Professors rated the trialability of micro-credentials significantly higher than Students (mean difference = 0.263, $p = .008$). No other pairwise comparisons were statistically significant, suggesting that Professors uniquely perceived micro-credentials to be more readily sampled on a small scale compared to Students.

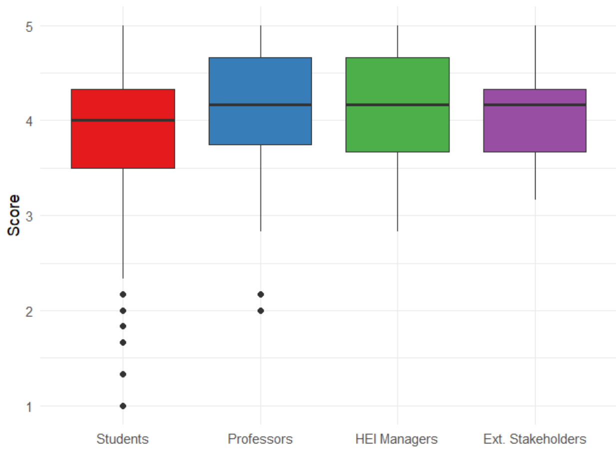

Figure 7- Trialability scores by pilot group

Observability by pilot group

A one-way ANOVA examining Observability scores by pilot group revealed a significant effect, $F(3, 698) = 14.60$, $p < .001$. Tukey post hoc comparisons showed that Professors (mean difference = 0.481, $p < .001$) and HEI Managers (mean difference = 0.525, $p = .001$) both reported significantly higher Observability compared to Students, indicating that these groups perceived the benefits of micro-credentials to be more readily visible. No other pairwise comparisons reached significance.

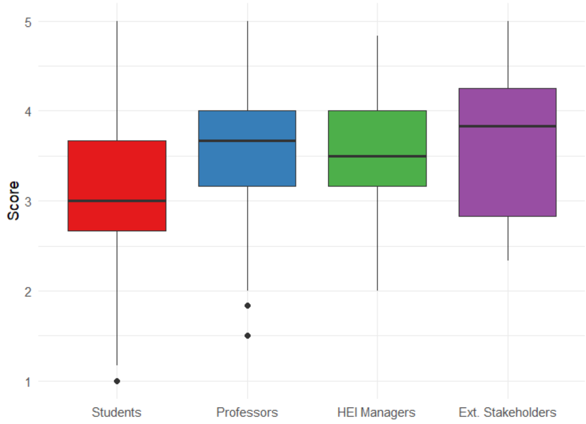

Figure 8- Observability by pilot group

Scores by gender

The subsequent section presents the overall scores analyses by gender, comparing micro-credential evaluations for male and female participants (non-binary participants were excluded from the analysis because of the small subsample size). This approach identifies whether different gender subgroups diverge in their perceptions of each key measure.

Relative Advantage scores by gender

A one-way ANOVA examining Relative Advantage scores across genders did not show a significant effect, $F(1, 693) = 2.64$, $p = .105$, indicating that both genders held similar views regarding the perceived benefits of micro-credentials.

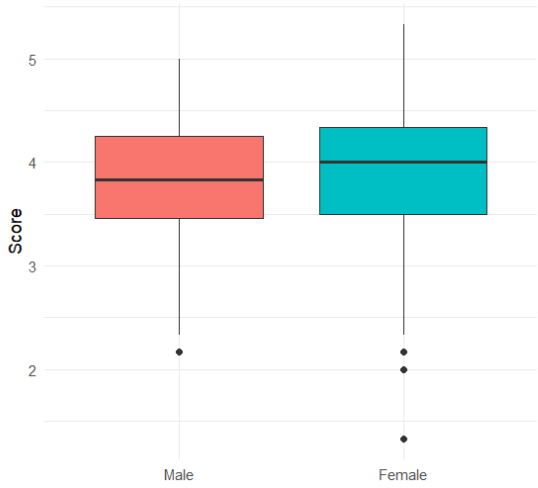

Figure 9 score relative to gender

Compatibility scores by gender

A one-way ANOVA assessing Compatibility scores by gender indicated no significant difference, $F(1, 692) = 0.021$, $p = .886$. Consequently, male and female participants reported comparable levels of perceived alignment between micro-credentials and their individual lifestyles or preferences.

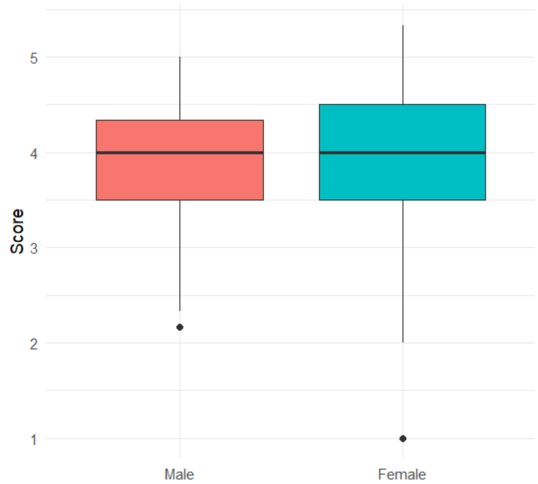

Figure 10- Compatibility scores by gender

Complexity scores by gender

A one-way ANOVA comparing Complexity scores across genders revealed no significant effect, indicating that male and female participants perceived the complexity of micro-credentials at similar levels.

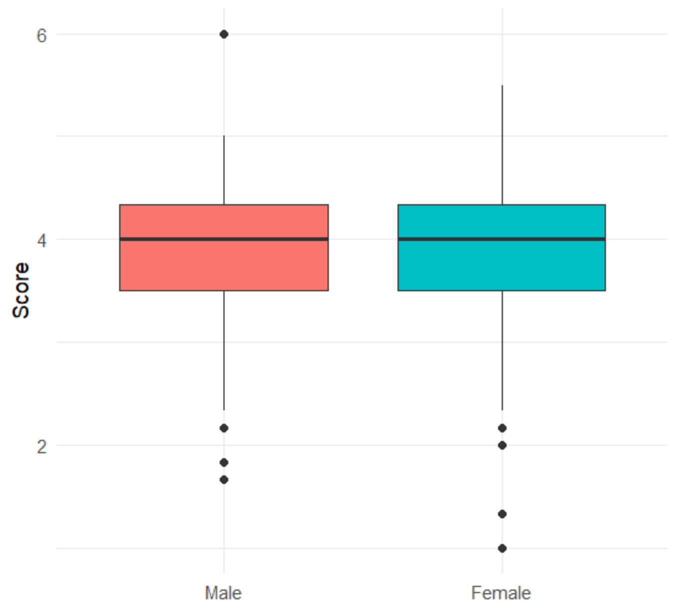

Figure 11- Complexity scores by gender

Trialability scores by gender

A one-way ANOVA examining Trialability scores across genders approached but did not reach significance, $F(1, 692) = 3.71$, $p = .055$. Thus, male and female participants did not differ reliably in their perceptions of how easily micro-credentials can be sampled or tested on a small scale.

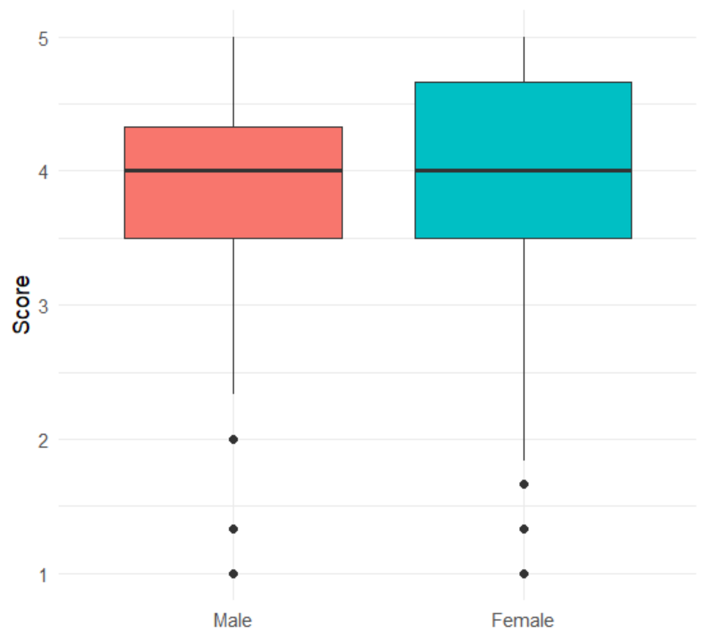

Figure 12- Trialability scores by gender

Observability scores by gender

A one-way ANOVA evaluating Observability scores across genders did not show a significant difference, $F(1, 692) = 2.38$, $p = .123$. Consequently, male and female respondents exhibited comparable perceptions regarding the visibility and measurability of micro-credential benefits.

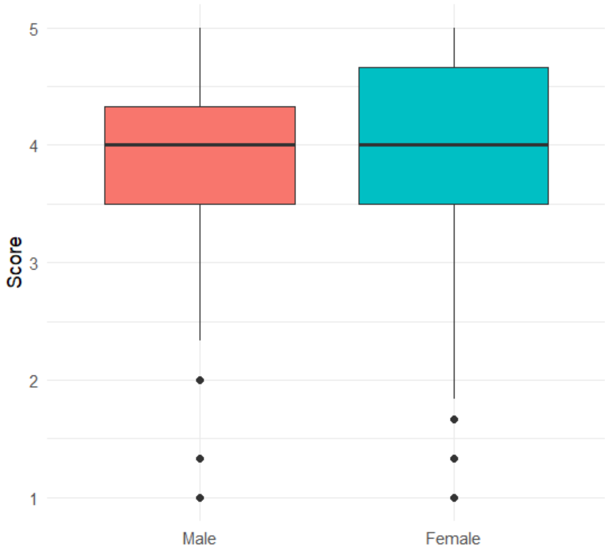

Figure 13- Observability scores by gender

Scores by educational qualification

The present sections focus on the overall micro-credential scores stratified by educational qualification, and indicates whether respondents with varying academic backgrounds differ in their perceptions of each measure.

Relative Advantage scores by educational qualification

A one-way ANOVA indicated that educational qualification significantly influenced Relative Advantage scores, $F(5, 680) = 2.44$, $p = .033$. However, despite the significant overall effect, no specific pairwise contrasts reached statistical significance in the Tukey post hoc comparisons. Consequently, although there may be subtle variations in how different educational groups perceive the benefits of micro-credentials, these differences were not statistically pronounced between any two groups.

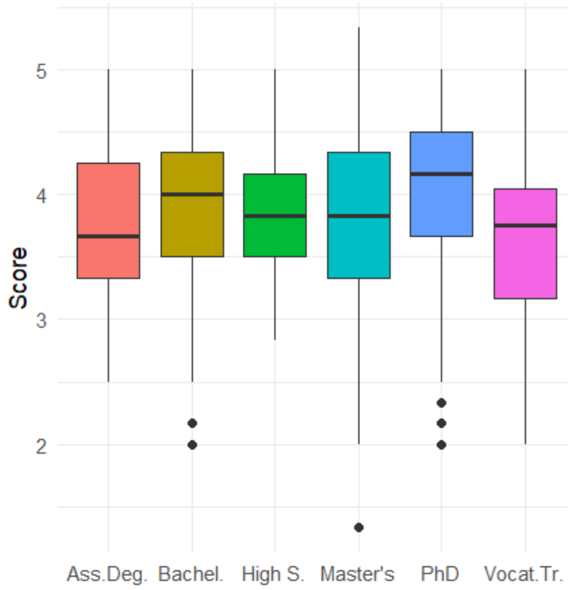

Figure 14- Relative Advantage scores by educational qualification

Compatibility scores by educational qualification

A one-way ANOVA revealed no significant effect of educational qualification on Compatibility scores, $F(5, 679) = 1.01$, $p = .411$. Therefore, respondents across different levels of academic attainment did not differ substantially in their assessments of how well micro-credentials align with their individual needs or lifestyles.

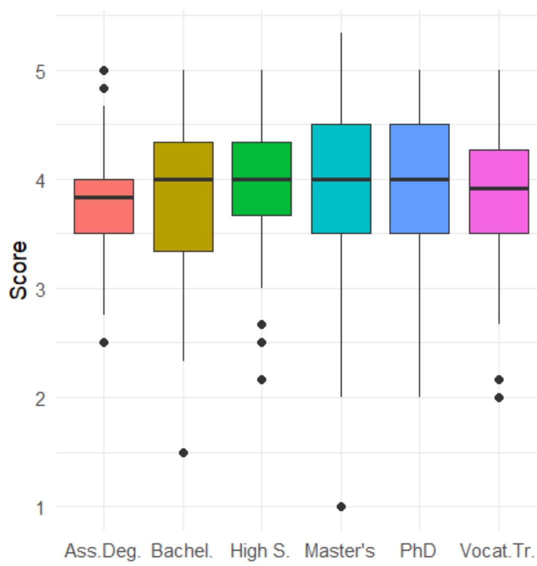

Figure 15- Compatibility scores by educational qualification

Complexity scores by educational qualification

A one-way ANOVA identified a significant effect of educational qualification on Complexity scores, $F(5, 679) = 6.57$, $p < .001$. Tukey post hoc comparisons revealed that Bachelor's degree holders scored higher than Associate's degree holders (diff = 0.420, $p = .010$). High School attendees scored higher than Associate's degree holders (diff = 0.480, p = .001). PhD holders scored lower than Bachelor's degree holders (diff = -0.339, p = .002), lower than High School attendees (diff = -0.399, p < .001), and lower than Master's degree holders (diff = -0.243, p = .028). No other pairwise contrasts reached significance, suggesting that those with High School or Bachelor's degrees perceive higher ease of adoption and use concerning micro-credentials compared to Associate's degree holders, whereas PhD holders tend to find micro-credentials more complex than those with Bachelor's, High School, or Master's qualifications.

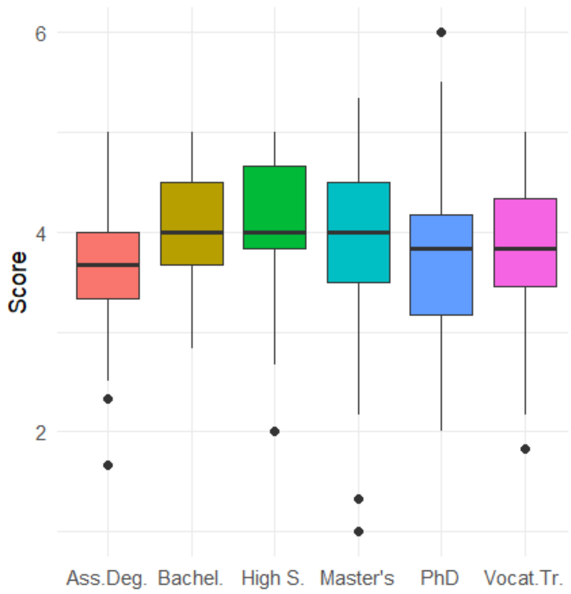

Figure 16- Complexity scores by educational qualification

Trialability scores by educational qualification

A one-way ANOVA assessing Trialability scores across educational qualifications did not reveal a statistically significant effect. Consequently, respondents at different levels of academic attainment perceived the ease of sampling micro-credentials on a small scale in a similar manner, suggesting that educational background exerts minimal influence on perceptions of Trialability.

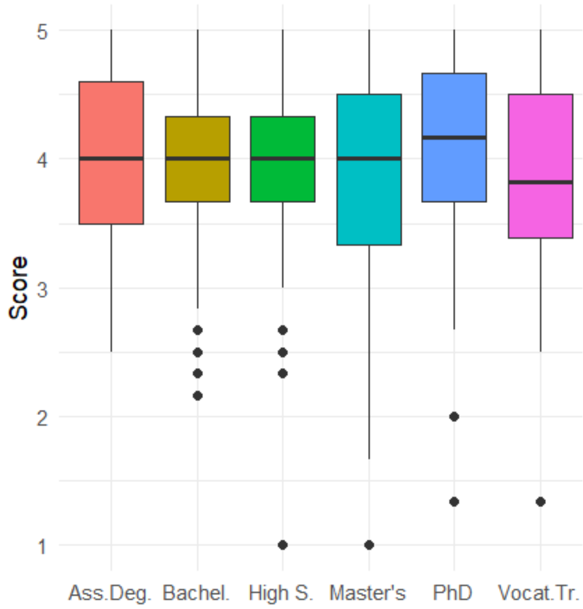

Figure 17- Trialability scores by educational qualification

Observability scores by educational qualification

A one-way ANOVA showed a significant effect of educational qualification on Observability scores, $F(5, 679) = 5.30$, $p < .001$. Tukey post hoc tests indicated that PhD holders reported significantly higher Observability than Associate's degree holders (diff = 0.435, p = .037), Bachelor's degree holders (diff = 0.329, p = .022), High School attendees (diff = 0.498, p < .001), Master's degree holders (diff = 0.339, p = .004), and Vocational Training participants (diff = 0.454, p = .019). No other comparisons reached significance, suggesting that individuals with a PhD perceive the benefits of micro-credentials to be more visible and readily observed compared to all other educational levels.

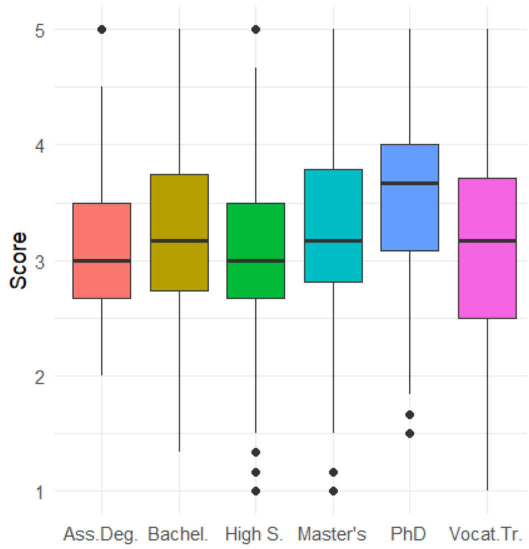

Figure 18- Observability scores by educational qualification

Interaction Effects

To assess whether interactions between pilot group and educational qualification influence micro-credential evaluations (with age included as a covariate), a series of three-way ANCOVAs were conducted for each measure. For **Relative Advantage**, only the interaction between age and pilot group was significant, $F(1, 662) = 5.53$, $p = .019$, whereas the interaction between pilot group and educational qualification, as well as the three-way interaction, were not statistically significant. In the analysis of **Compatibility**, none of the two-way or three-way interactions reached significance. For **Complexity**, the interactions were non-significant, although the three-way interaction trended toward significance, $F(5, 661) = 2.16$, $p = .057$. The ANCOVA on **Trialability** scores revealed a significant interaction between age and pilot group, $F(1, 661) = 7.31$, $p = .007$, while the remaining interactions were not significant. Lastly, for **Observability**, no significant interaction effects were detected. These findings indicate that the effect of pilot group on the outcome measures does not depend on the level of educational qualification, i.e., educational qualification does not moderate the influence of pilot group on these evaluations.

Item-level differences

Item-level differences in Relative Advantage

A repeated measures ANOVA was conducted to assess item-level differences in the Relative Advantage dimension. The analysis revealed a significant effect of the item number, $F(5, 3240) = 77.422$, $p < .001$, indicating that ratings differed significantly across the six Relative Advantage items. Mauchly's test indicated a violation of sphericity ($W = 0.781$, $p < .001$), and Greenhouse-Geisser corrections were applied ($\varepsilon = 0.914$). Post hoc pairwise comparisons with Bonferroni adjustments showed that item 1 ($M = 4.17$, $SE = 0.035$) was rated significantly higher than item 2 ($M = 3.74$, $SE = 0.038$; mean difference = 0.430, $p < .001$), item 4 ($M = 3.71$, $SE = 0.040$; mean difference = 0.461, $p < .001$), item 5 ($M = 3.65$, $SE = 0.038$; mean difference = 0.522, $p < .001$), and item 6 ($M = 3.73$, $SE = 0.040$; mean difference = 0.439, $p < .001$). In addition, item 2 was rated significantly lower than item 3 ($M = 4.21$, $SE = 0.031$; mean difference = -0.470, $p < .001$). No significant differences were observed between item 1 and item or between item 2 and item 4 and item 6. Therefore, particularly item 1 and item are perceived more favourably than others.

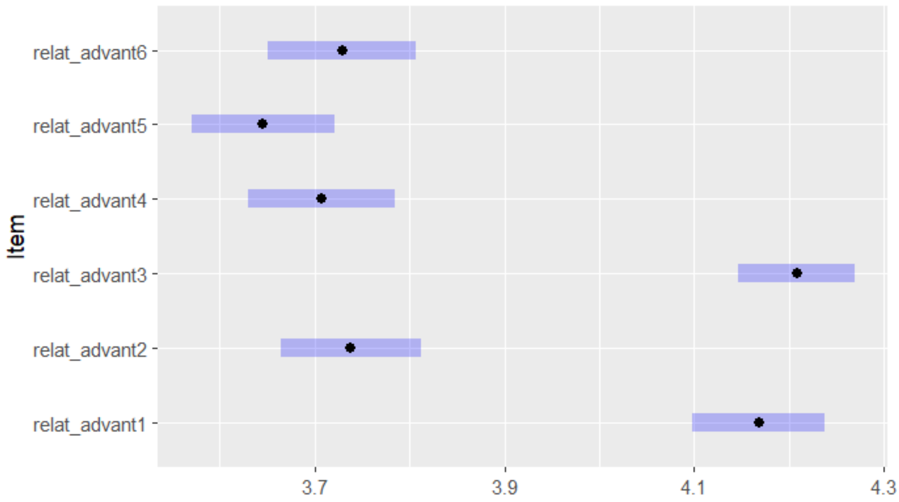

Figure 19- Item-level differences in Relative Advantage

Item-level differences in Compatibility

A repeated measures ANOVA was conducted to assess item-level differences in the Compatibility dimension. The analysis indicated a significant effect of the item number, $F(5, 3230) = 14.55$, $p < .001$, suggesting that the six items measuring Compatibility were rated differently by respondents. Mauchly's test revealed a violation of sphericity ($W = 0.76$, $p < .001$), so Greenhouse-Geisser corrections were applied ($\varepsilon = 0.90$). Post hoc pairwise comparisons with Bonferroni adjustments showed that item 1 ($M = 3.85$, $SE = 0.04$) was rated significantly lower than item 2 ($M = 3.98$, $SE = 0.03$; difference = –0.13, $p = .019$) and item 4 ($M = 4.10$, $SE = 0.03$; difference = –0.25, $p < .001$). Additionally, item 2 was rated significantly higher than item 6 ($M = 3.81$, $SE = 0.04$; difference = 0.17, $p < .001$), while it was significantly lower than item 4 (difference = –0.11, $p = .017$). Item 3 ($M = 3.90$, $SE = 0.04$) was rated significantly lower than item 4 (difference = –0.20, $p < .001$). Further, item 4 was rated higher than item 5 ($M = 3.90$, $SE = 0.04$; difference = 0.20, $p < .001$) and item 6 (difference = 0.28, $p < .001$).

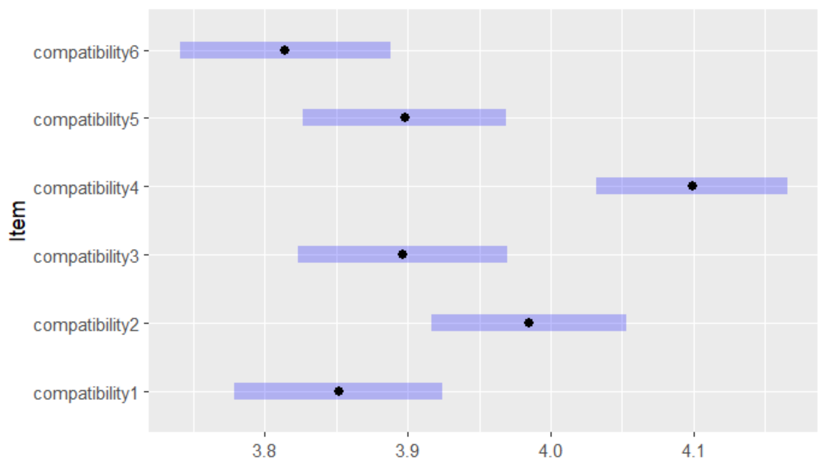

Figure 20- Item-level differences in Compatibility

Item-level differences in Complexity

A repeated measures ANOVA was conducted to examine whether respondents rated the six items related to Complexity differently (where higher scores indicate greater ease of use). The analysis revealed a significant effect of the item number, $F(5, 3505) = 15.64$, $p < .001$, and Mauchly's test indicated again a violation of sphericity ($W = 0.87$, $p < .001$). Greenhouse-Geisser corrections were applied ($\varepsilon = 0.95$). Post hoc pairwise comparisons with Bonferroni adjustments showed that item 1 ($M = 3.83$, $SE = 0.04$) was rated significantly lower than item 2 ($M = 3.95$, $SE = 0.03$; difference = −0.11, $p = .025$), item 4 ($M = 4.03$, $SE = 0.03$; difference = −0.20, $p < .001$), and item 6 ($M = 4.05$, $SE = 0.03$; difference = −0.22, $p < .001$). Item 2 was rated higher than item 3 ($M = 3.83$, $SE = 0.04$; difference = 0.12, $p = .015$), whereas item 3 was lower than items 4 (difference = −0.20, $p < .001$) and 6 (difference = −0.22, $p < .001$). Item 4 was rated higher than item 5 ($M = 3.86$, $SE = 0.03$; difference = 0.16, $p < .001$), and item 5 was rated lower than item 6 (difference = −0.18, $p < .001$).

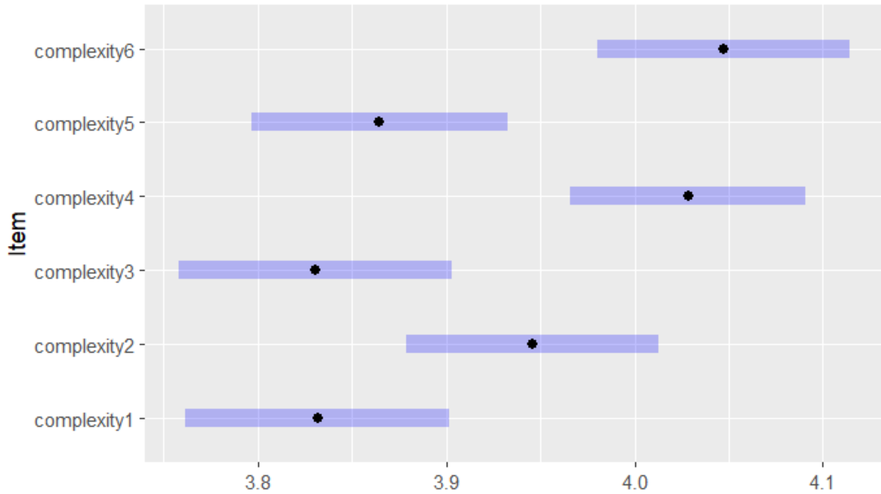

Figure 21- Item-level differences in Complexity

Item-level differences in Trialability

A repeated measures ANOVA was conducted to examine item-level differences in the Trialability dimension. The analysis revealed a significant effect of item number, $F(5, 3240) = 48.04$, $p < .001$, indicating that the six items were rated differently. Mauchly's test showed a violation of sphericity ($W = 0.66$, $p < .001$), and Greenhouse-Geisser corrections were again applied ($\varepsilon = 0.85$). Post hoc pairwise comparisons with Bonferroni adjustments indicated that item 4 ($M = 4.13$, $SE = 0.03$) was rated significantly higher than item 1 ($M = 3.88$, $SE = 0.04$; difference = –0.25, $p < .001$), item 2 ($M = 3.95$, $SE = 0.04$; difference = –0.18, $p < .001$), and item 3 ($M = 4.01$, $SE = 0.04$; difference = –0.13, $p = .001$). Item 5 ($M = 3.62$, $SE = 0.04$) was rated significantly lower than items 1 (difference = –0.26, $p < .001$), 2 (difference = –0.33, $p < .001$), 3 (difference = –0.38, $p < .001$), 4 (difference = –0.51, $p < .001$), and 6 (difference = –0.39, $p < .001$). In addition, item 1 was rated lower than item 3 (difference = –0.12, $p = .001$) and item 6 ($M = 4.02$, $SE = 0.03$; difference = –0.14, $p = .004$), whereas item 3 was lower than item 4 (difference = –0.13, $p = .001$) and item 6 (difference = –0.01) did not differ significantly.

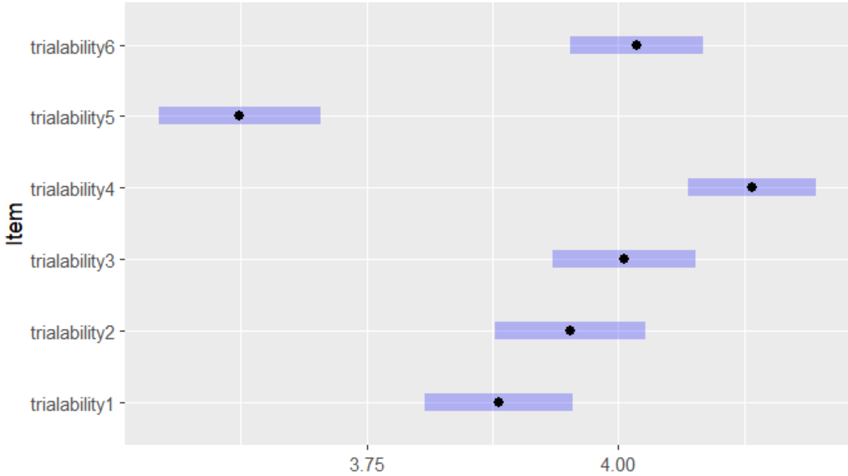

Figure 22- Item-level differences in Trialability

Item-level differences in Observability

A repeated measures ANOVA was conducted to evaluate item-level differences in the Observability dimension. The analysis yielded a significant effect of item, $F(5, 3240) = 24.51$, $p < .001$, indicating that participants' ratings differed across the six Observability items. Mauchly's test suggested a violation of sphericity ($W = 0.80$, $p < .001$), and Greenhouse-Geisser corrections were applied ($\varepsilon = 0.92$). Post hoc pairwise comparisons (Bonferroni-adjusted) indicated that item 1 ($M = 3.37$, $SE = 0.04$) was rated significantly higher than item 2 ($M = 3.26$, $SE = 0.04$; difference = 0.11, $p = .006$), item 3 ($M = 3.22$, $SE = 0.04$; difference = 0.15, $p < .001$), item 4 ($M = 3.02$, $SE = 0.04$; difference = 0.35, $p < .001$), and item 5 ($M = 3.17$, $SE = 0.04$; difference = 0.20, $p < .001$), but did not differ significantly from item 6 ($M = 3.32$, $SE = 0.04$). Item 2 was rated higher than item 4 (difference = 0.24, $p < .001$), whereas item 3 was rated higher than item 4 (difference = 0.21, $p < .001$), and item 4 was lower than items 5 (difference = −0.15, $p < .001$) and 6 (difference = −0.30, $p < .001$). Finally, item 5 was rated lower than item 6 (difference = −0.15, $p = .001$).

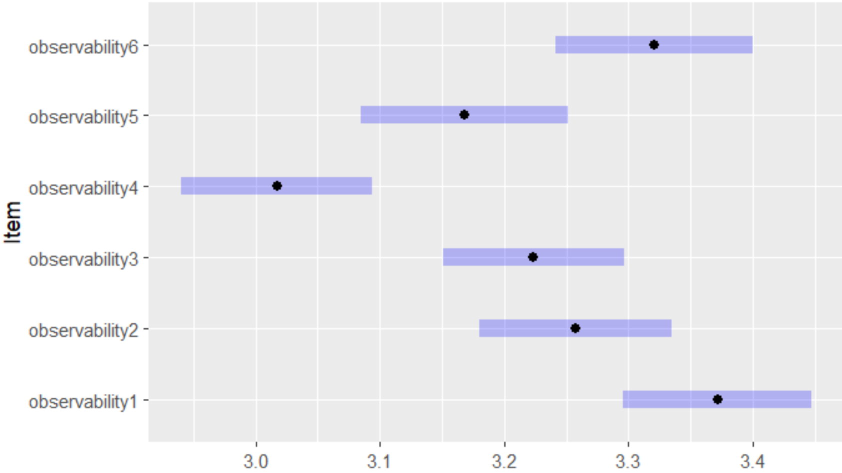

Figure 23- Item-level differences in Observability

Conclusions and recommendations to partner Institutions and to National and EU-level Policymakers Related to Micro-credential Programmes and Qualifications

General Perceptions of Micro-credentials

The evaluation results provide an overall positive picture of how micro-credentials are perceived by key stakeholders involved in the MCE project. Across the five dimensions of analysis—**Relative Advantage**, **Compatibility**, **Complexity**, **Trialability**, and **Observability**—micro-credentials were well received, with **Trialability** emerging as the most positively rated dimension. This suggests that stakeholders appreciate the opportunity to engage with micro-credentials in a low-risk, flexible manner, supporting the broader HEI partner institutions agenda of modular, learner-centred education.

At the same time, **Observability**—the ability to clearly perceive the impact and outcomes of micro-credentials—was consistently rated the lowest. This indicates a significant visibility gap. While stakeholders find micro-credentials easy to test and compatible with their routines and existing processes/contexts, they are less convinced of their tangible benefits, such as improved employability or professional recognition. These findings highlight an important area for development: increasing the visibility and demonstrable impact of micro-credentials is essential for fostering broader acceptance and adoption.

Group-Specific Perceptions

When disaggregating the data by stakeholder group, notable differences in perception emerge. **Students** appear more hesitant about micro-credentials compared to other groups. They rated **Relative Advantage**, **Compatibility**, and **Observability** significantly lower than **Professors**, **HEI Managers**, and **External Stakeholders**. This suggests that students may not yet fully understand or trust the value of micro-credentials in advancing their academic or career goals. Their more reserved views highlight the need for improved communication and guidance regarding the purpose, recognition, and potential pathways enabled by these short-form learning opportunities.

By contrast, **Professors** and **HEI Managers** expressed more confidence in micro-credentials. They saw greater value in the ability to pilot and refine new educational approaches, as reflected in their higher scores on **Trialability**. This suggests that academic staff and institutional leaders are more inclined to view micro-credentials as tools for innovation and diversification within their teaching and strategic agendas.

External stakeholders, including employers and professional organisations, also had a positive perception of micro-credentials, but reported higher levels of **Complexity** compared to other groups. This points to potential challenges in understanding, implementing, or aligning micro-credentials with internal systems such as human resource development or industry certification frameworks.

Taken together, these group-specific perceptions indicate that tailored strategies are needed: students need clearer pathways and clearer communication regarding the value of micro-credentials; institutional staff need support to scale innovative practices effectively; and external stakeholders require engagement mechanisms that reduce complexity and foster mutual understanding, ensuring micro-credentials align with their needs and systems.

Demographic Influences

Demographic factors were found to play a relatively minor role in shaping perceptions overall, but several patterns are worth noting. **Gender** did not significantly influence responses across any of the five evaluative dimensions, indicating broad alignment in how male and female participants perceived micro-credentials.

With respect to **age**, older respondents tended to rate micro-credentials as slightly more complex and less observable. While these differences were not substantial, they suggest that mature learners may face subtle barriers to engagement—whether technological, procedural, or perceptual—that merit attention when designing inclusive lifelong learning initiatives.

Educational background also influenced responses in meaningful ways. Participants holding a **PhD** rated **Observability** higher than other groups, suggesting they may be more attuned to the long-term or systemic benefits of micro-credentials. On the other hand, those with **Bachelor's or High School qualifications** perceived greater ease of use, while individuals with an **Associate Degree** found micro-credentials more complex. Interestingly, **PhD** holders also tended to find micro-credentials more complex than those with Bachelor's or Master's degrees, perhaps reflecting a deeper awareness of academic and structural nuances in credentialing.

These demographic insights reinforce the importance of **designing micro-credentials and associated services with a diversity of users in mind**, particularly by ensuring clarity, simplicity, and support for less experienced or digitally confident learners.

Statistical Results

The results have shown significant differences in how respondents rated each dimension, with **Observability** scoring consistently and significantly lower than the others. This confirms the pattern seen across groups: while micro-credentials are generally highly appreciated for their accessibility and flexibility, their actual value and impact are less clearly perceived. Further, **correlation analyses** offer valuable insights into the interrelationship of stakeholder perceptions. A strong positive correlation between **Relative Advantage** and **Compatibility** indicates that when micro-credentials are seen as beneficial, they are also viewed as well-aligned with learners' or institutions' existing systems and needs. Weaker correlations between **Observability** and the other dimensions suggest that even when micro-credentials are appreciated in principle, the lack of visible outcomes continues to hamper their full acceptance. These results, overall, indicate the importance of improving the **communicability, tracking, and signaling value** of micro-credentials within educational and labour market ecosystems.

Final Takeaways and Strategic Recommendations

The findings of this study support several important conclusions for the future of micro-credentials in higher education. While there is strong support and enthusiasm—especially among academic staff and institutional leaders—the full potential of micro-credentials remains partially unrealised due to issues related to **visibility, learner engagement, and uneven understanding across stakeholder groups**. These concerns, particularly regarding the **observability** of benefits and outcomes, were evident across all stakeholder profiles surveyed and mirror institutional challenges raised in Van Melkebeke, L.., Op de Beeck, I., & Antonaci, A. (2025) and policy barriers addressed in Casa Nova, D., Bastos, G., & Antonaci, A. (2025).

For higher education institutions, the priority must be to bridge the gap between institutional readiness and learner uptake. As noted in Van Melkebeke, L.., et Al. (2025), academic staff are often the initiators of micro-credential development, yet learners still express uncertainty about their value and purpose. This disconnect highlights the need for institutions to implement **co-design practices** with students and employers, integrate success stories into outreach, and enhance the transparency of value and recognition pathways. These findings directly reinforce the pilot-based insights in Feliz- Murias, F., et Al. (2025) , which illustrate how stackable and modular formats can provide more accessible, flexible, and tailored learning experiences—especially for under-represented or non-traditional learners.

To reduce complexity and increase uptake, institutions should also simplify access, enrolment, and recognition processes. Offering stackability and clear learning progression pathways—emphasised across both Feliz- Murias, F., et Al., (2025) and Casa Nova, D., et Al. (2025)—can increase engagement, especially when combined with **digital verification tools** and shared credential repositories such as **Europass**. Additionally, targeted incentives for faculty participation in micro-credential development and delivery can promote stronger integration into teaching and curriculum design. Van Melkebeke, L.., et Al. (2025) has already emphasised the importance of institutional capacity-building and intra-institutional collaboration as key enablers of sustained implementation.

At the policy level, national and European decision-makers must support these institutional efforts by fostering alignment with **EQF and ECTS standards**, providing flexible accreditation pathways, and ensuring that quality assurance mechanisms are adapted to micro-credentials. These areas—identified as essential in Casa Nova, D., et Al. (2025)—must be backed by **funding schemes and structural incentives** to enable long-term integration. Furthermore, as all MCE deliverables argue, a sustainable micro-credential ecosystem must involve employers and sectoral bodies in both **co-design and validation**, especially to keep pace with evolving labour market demands.

Overall, the findings of this deliverable validate the **MCE project's holistic, multi-stakeholder approach**. They provide compelling evidence that micro-credentials can be a transformative force in higher education—**but only if their visibility, integration, and strategic positioning are strengthened** across both institutional and policy frameworks. If these gaps are addressed in a coordinated manner, micro-credentials can become a cornerstone of a more **flexible,**

inclusive, and learner-centred higher education system in Europe, as envisioned throughout the MCE project.

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