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Indonesian adaptation and validation of the Social Media Competence Scale for College Students (SMC-CS): A confirmatory factor analysis approach

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Abstract

The rapid integration of social media into students' academic, social, and personal lives underscores the need for valid and reliable instruments to assess social media competence. Understanding this competence is crucial, as social media is not only a communication tool but also a source of information, a space for self-expression, and a domain for identity formation. This study aimed to adapt and validate the Social Media Competence Scale for College Students (SMC-CS) into Bahasa Indonesia. The adaptation process followed standardized cross-cultural procedures, including translation, expert review for content validity, conceptual alignment, and pilot testing. A total of 728 university students aged 17–25 years from various Indonesian institutions participated in this study. Data analysis was conducted using Confirmatory Factor Analysis (CFA) with the MLM estimator to address multivariate non-normality. The Indonesian version of the SMC-CS demonstrated a four-factor structure—Technical Usability, Content Interpretation, Content Generation, and Affective Regulation—with strong reliability (CR > 0.83) and acceptable convergent validity (AVE ≥ 0.47). These findings provide evidence that the adapted instrument is both valid and reliable for assessing college students' social media competence in the Indonesian context.

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INTRODUCTION

In the last decade, social media has developed into a vital platform in young people's social, academic, and professional worlds globally, including university students in Indonesia. For learners, social media is not only a site for communication, but it also serves a platform for obtaining information, for self-expression and for developing identity (Bozkurt & Tu, 2016; Choi & Lim, 2016). But heavy daily or extreme use of social media is not the same as exhibiting good or desirable digital competence. This indicates that a more holistic and standardized appreciation and evaluation of social media competence is needed (Polanco-Levicán & Salvo-Garrido, 2022; Spante et al., 2018; Zhu et al., 2020).

Social media competence enfolds the characteristics of personal skills in which users are able to approach their digital medium in a positive, productive, and responsible manner. Zhu et al. (2020) conceptually defined this construct as comprising four subscales, namely Technic al Usability (TU), Content Interpretation (CI), Content Generation (CG), and Affective Regulation (AR). These dimensions emphasize not only technical competence but also the cognitive and emotional dimensions

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of digital communication. There is growing evidence that digital literacy models concentrating solely on technical aspects of use are inadequate for addressing the complexities of online social behavior (Reynolds, 2016; Van Laar et al., 2017; Wei, 2024). Multidimensional assessments are therefore necessary for capturing social media competence, particularly within higher education, which plays a pivotal role in fostering critically aware and socially responsible digital citizens. The Social Media Competence Scale for College Students (SMC-CS) was chosen for this study because it was specifically developed to measure this multidimensional construct among university students, and the original validation study demonstrated a strong factor structure, reliable internal consistency, and solid evidence of validity (Zhu et al., 2020). These qualities make the SMC-CS particularly appropriate for cross-cultural adaptation and validation in the Indonesian higher education context.

In Indonesia, despite the fact that the extent of access to internet and social media by university students is on the increase, there is very little research that measures social media competence directly using a valid instrument and standard (Akbar & Kusnandar, 2024; Huwaida et al., 2024). Previous studies have focused primarily on the behavioral consequences of social media use, such as addiction and academic performance (Balhara et al., 2018; Pramukti et al., 2023; Sujarwoto et al., 2023), without differentiating between the frequency of use and the quality of competence. The absence of a locally validated measure restricts the deployment of evidence-based digital literacy education. Hence, there is an imminent requirement of a reliable and valid instrument that has been systematically cross-culturally adapted in the Indonesian context.

Cross-cultural adaptation and validation of instruments is a significant methodological step, which could ensure conceptual and statistical equivalence across contexts of the instruments previously applied (Beaton et al., 2000; Cruchinho et al., 2024). The procedure involves translation and adaptation of the instrument in linguistic and cultural terms, and empirical testing of the factor structure, construct validity, and internal consistency of the instrument. Utilizing a Confirmatory Factor Analysis (CFA) based validation approach allows for the exploration of the potential to replicate the original theoretical model in the new cultural context (Brown et al., 2017; Kline, 2023). This is especially true as the framing of emotional expression, content comprehension and norms of online conduct may be strongly shaped by local cultural values (Döveling et al., 2018).

Previous research has highlighted the need to systematically conceptualize and measure social media competence across different populations and cultural contexts. Early work by Alber et al. (2015) designed and tested an inventory specifically for measuring social media competency among certified health education specialists, providing one of the first validated instruments in the field, though limited to a health communication context. Extending this line of work, Walsh et al. (2016) developed and validated a scale assessing employees' company reputation-related social media competence, thereby situating the construct within organizational and marketing domains. More recently, Sharma and

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Sharma (2022) assessed social media competence among male and female users in India, demonstrating the relevance of this construct in a broader sociocultural context. Relatedly, Tzafilkou et al. (2022) advanced the Students' Digital Competence Scale (SDiCoS), underscoring the educational applications of digital and social media competence assessment.

Beyond these efforts, Masur et al (2021) explicitly referenced Zhu et al.'s (2020) SMC-CS in their development of a new critical media literacy item pool, thereby situating the SMC-CS within a broader framework of media literacy measurement. Most recently, Zou et al. (2024) adapted the instrument in the United States to examine learners' engagement patterns and outcomes in a youth-focused media literacy intervention, further demonstrating its cross-cultural adaptability and robustness. Collectively, these studies provide evidence that the SMC-CS and related frameworks have been applied, adapted, and validated across health, organizational, educational, and cultural contexts, thereby strengthening the rationale for adapting the instrument to the Indonesian higher education context.

METHOD

Research Design

This study employed a quantitative, non-experimental research design with the primary objective of adapting and validating the Indonesian version of the Social Media Competence Scale for College Students (SMC-CS), originally developed by Zhu et al. (2020). The adaptation process followed internationally recommended procedures for the cross-cultural translation of psychological instruments (Beaton et al., 2000; Cruchinho et al., 2024). Validity evidence based on internal structure was assessed through Confirmatory Factor Analysis (CFA) using a covariance-based structural equation modeling approach.

Participants

A total of 728 undergraduate students participated in this study, representing the target population for assessing social media competence in the higher education context. Based on demographic data, 512 participants (70.3%) were female and 216 (29.7%) were male, with ages ranging from 17 to 25 years ($M = 20.55$ years, $SD = 1.96$). Most participants were enrolled in Psychology programs (43.1%), followed by Communication Studies (21.8%), Education (15.3%), and the remaining 19.8% from various other fields such as Engineering, Economics, and Public Administration. Participants were recruited from multiple regions across Indonesia, with the largest proportion from Makassar, followed by Medan, Banyumas, Yogyakarta, Palembang, Surabaya, Jakarta, Malang, Surakarta, Lombok, and Sorong, reflecting a geographically diverse sample. Further demographic details are presented in Table 1.

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Table 1. Demographic Characteristics of Participants (N = 728)

Variable	Frequency	Percentage (%)
Gender		
Male	216	29.7
Female	512	70.3
Age		
17–19 years	218	29.9
20–22 years	401	55.1
23–25 years	109	15.0
Study Program		
Psychology	314	43.1
Communication	159	21.8
Education	111	15.3
Others	144	19.8
Geographical Location		
Makassar	320	43.9
Medan	92	12.6
Banyumas	81	11.1
Yogyakarta	74	10.2
Palembang	68	9.3
Surabaya	63	8.7
Lombok	20	2.7
Sorong	10	1.4

Social Media Use Characteristics

Regarding social media engagement, all participants reported being active users on a daily basis. The frequency and duration of social media use were assessed to understand their level of digital engagement, which is critical for interpreting social media competence. A total of 87.1% reported using social media every day, while 9.5% reported usage on five to six days per week, and 3.4% used social media between two and four days per week. The average daily duration of use was 5.2 hours (SD = 1.8). However, rather than categorizing this figure as a "high" level of exposure, it is important to specify the norms or criteria against which this judgment is made. Without a clear benchmark—for example, comparisons to national usage surveys or established thresholds in prior studies—it is difficult to evaluate whether the sample represents typical users, moderately heavy users, or extreme cases of digital engagement (see Table 2).

Table 2. Frequency and Duration of Social Media Use

Variable	Frequency	Percentage (%)
Frequency of Social Media Use		
Every day	634	87.1
5–6 days per week	69	9.5
2–4 days per week	25	3.4
Daily Duration of Use		
Less than 2 hours	51	7.0
2–4 hours	132	18.1
4–6 hours	319	43.8
More than 6 hours	226	31.0
Mean	—	*M* = 5.2 hours
Standard Deviation	—	*SD* = 1.8

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These findings confirm that Indonesian university students are highly active social media users, with the majority spending more than four hours per day engaging in digital interactions. Such prolonged exposure provides a relevant context for assessing social media competence dimensions, as consistent interaction can enhance users' technical, evaluative, and emotional regulation skills, which are core components of the SMC-CS instrument.

Instrument

The social media competence scale adopted from SMC-CS. Zhu et al first proposed it. (2020), consists of 28 items on four subscales including (1) Technical Usability (TU) assesses how to use and navigate standard online environments; (2) Content Interpretation (CI) refers to the ability to interpret and analyze information on the web and critically evaluate web information; (3) Content Generation (CG) addresses the ability to generate, organize and serve the content; and (4) Affective Regulation (AR) assesses the awareness and regulation of emotions during the experience on the web.

In the original validation study, Zhu et al. (2020) employed both exploratory and confirmatory factor analyses to establish construct validity. The four-factor structure demonstrated strong psychometric properties, with high internal consistency across subscales (Cronbach's α ranging from .92 to .95) and excellent reliability for the overall scale (α = .97). Convergent validity was confirmed through significant item loadings, with factor loadings ranging from .61 to .80 across dimensions. CFA further supported the robustness of the model, yielding acceptable fit indices ($\chi^2/df = 2.82$, RMSEA = .077, SRMR = .039, CFI = .94, NFI = .91). These findings provided evidence that the SMC-CS is a theoretically grounded and statistically reliable measure of social media competence in higher education.

Response options were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Indonesian version of the tool was adapted using the cross-cultural instrument translation and adaptation process proposed by Beaton et al. (2000), which includes forward translation, synthesis, back-translation, expert panel review, and pretesting. Forward translation was conducted by two bilingual Indonesian translators, both of whom held master's degrees in psychology and possessed IELTS scores of 7 or higher, ensuring both linguistic and conceptual accuracy. The two versions were synthesized and reconciled to maintain conceptual continuity. Back-translation into English was performed by another two bilingual Indonesian experts with the same academic and linguistic qualifications, and the resulting version was compared with the original to check for semantic equivalence.

Expert judgment was then carried out to evaluate content validity. A panel of five experts participated in this process, consisting of psychology faculty members from Universitas Negeri Jakarta, Universitas Negeri Makassar, Universitas Pendidikan Indonesia, Universitas Muhammadiyah Purwokerto, and Universitas Hasanuddin. Each expert assessed the relevance and clarity of the items, and the evaluations were analyzed using Aiken's V coefficient. The results yielded values ranging from

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0.82 to 0.91, which fall within the acceptable to high range for content validity (Aiken, 1985). Based on the experts' feedback, several items were revised for conceptual clarity and cultural appropriateness. A pilot test involving 30 Indonesian university students was subsequently conducted to examine item clarity and cultural relevance. Minor adjustments were made to item wording following student feedback to improve face validity before full-scale administration.

Procedure

The study was conducted entirely online due to geographical distribution and accessibility. The final Indonesian version of the SMC-CS was distributed using Google Forms. Participants were recruited via social media platforms and university mailing lists, and each participant provided informed consent digitally before proceeding with the questionnaire. They were informed about the voluntary nature of participation, the anonymity of their responses, and the confidentiality of the data. No incentives were offered for participation. Data were collected over a four-week period during the second academic semester of 2023–2024.

Data Analysis

All data analyses were conducted using Mplus version 8.3 for CFA. Prior to CFA, data were screened for missing values and assessed for normality. Multivariate normality was evaluated using Mardia's coefficient. Given that the data did not meet the assumption of multivariate normality, the robust Maximum Likelihood Mean-adjusted (MLM) estimator—also known as the Satorra–Bentler correction—was applied in the CFA. This estimator is recommended for analyzing Likert-scale data with deviations from normal distribution (Kline, 2023; Widaman & Helm, 2023).

Model fit was assessed by several indicators: Chi-square, Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The CFI and TLI values >. 90, whereas RMSEA and SRMR values were ≤. 08 (Hu & Bentler, 1999; Marsh et al., 2020). We also used standardized factor loadings to test the performance of items in each construct. Convergent validity was examined based on Average Variance Extracted (AVE) of ≥. 40 and the Composite Reliability (CR) with criteria of ≥. 70 as recommended by Fornell and Larcker (1981).

RESULTS

Descriptive Statistics

The descriptive analysis of each construct score in the Indonesian version of the Social Media Competence Scale for College Students (SMC-CS) revealed varying means, indicating a different level of social media competence among participants. Table 3 presents the descriptive summary for each factor.

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Table 3. Descriptive Statistics of Social Media Competence Factors (N = 728)

Factor	Total of Items	Score Range	Mean	SD
TU	5	5 – 25	13.05	3.27
CI	7	7 – 35	18.52	4.81
CG	7	7 – 35	17.35	4.64
AR	8	8 – 40	21.88	5.52
Total	27	27 – 135	70.81	13.86

Overall, the Technical Usability (TU) factor yielded a mean score of 13.05 (SD = 3.27), indicating that students have a fairly good ability to use the basic features of social media platforms. The Content Interpretation (CI) and Content Generation (CG) factors reflect the ability to analyze and responsibly produce content, with mean scores of 18.52 and 17.35, respectively. Meanwhile, the Affective Regulation (AR) dimension obtained the highest average score of 21.88 (SD = 5.52), suggesting that students demonstrate relatively good emotional management when engaging on social media. The total score across all 27 items indicates that most respondents fall into the moderate competence category (M = 70.81, SD = 13.86), which is consistent with digital-native student profiles in the contemporary era.

Multivariate Normality

Prior to CFA, multivariate normality was tested using Mardia's Multivariate Test. The results showed skewness = 101.544 ($p < .001$) and kurtosis = 1180.286 ($p < .001$) which suggests a breakdown of the multivariate normality assumption. To account for this violation, CFA in the present study used the Maximum Likelihood Mean-adjusted (MLM) estimation method (also referred to as Satorra–Bentler χ^2), which is less sensitive to non-normal data (Kline, 2023; Widaman & Helm, 2023). This estimator adjusts chi-square, and model fit indices in order to achieve a better interpretation of the models.

CFA Model Stage 1

CFA was conducted in two stages to evaluate the suitability of the factor structure of the Indonesian version of the SMC-CS, which consists of four latent dimensions: Technical Usability (TU), Content Interpretation (CI), Content Generation (CG), and Affective Regulation (AR). In the first stage, the initial model consisted of 28 items, including item AR21. The analysis results indicated that the model did not meet optimal model fit criteria (Table 5). Based on the results of the standardized factor loadings, most of the items showed estimated loadings above 0.50 and were statistically significant ($p < .001$), indicating substantial contributions to their respective constructs (see Table 4).

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Table 4. Standardized Factor Loadings – CFA Model Stage 1

Factor	Item	Estimate	S.E	P-Value
TU	TU1	0.559	0.031	<0.001
	TU2	0.603	0.035	<0.001
	TU3	0.677	0.029	<0.001
	TU4	0.749	0.023	<0.001
	TU5	0.585	0.039	<0.001
CI	CI6	0.606	0.025	<0.001
	CI7	0.476	0.030	<0.001
	CI8	0.692	0.025	<0.001
	CI9	0.740	0.027	<0.001
	CI10	0.715	0.023	<0.001
	CI11	0.704	0.024	<0.001
	CI12	0.678	0.024	<0.001
CG	CG13	0.657	0.024	<0.001
	CG14	0.520	0.039	<0.001
	CG15	0.664	0.026	<0.001
	CG16	0.655	0.023	<0.001
	CG17	0.669	0.028	<0.001
	CG18	0.682	0.024	<0.001
	CG19	0.632	0.030	<0.001
AR	AR20	0.594	0.027	<0.001
	AR21	**0.040**	**0.040**	**0.311**
	AR22	0.588	0.030	<0.001
	AR23	0.530	0.032	<0.001
	AR24	0.584	0.028	<0.001
	AR25	0.786	0.020	<0.001
	AR26	0.767	0.020	<0.001
	AR27	0.700	0.025	<0.001
	AR28	0.638	0.028	<0.001

However, item AR21 showed a loading of 0.040 and was not significant ($p = .311$), indicating that the item did not validly reflect the AR construct. Based on these findings, item AR21 was removed from the model and CFA was conducted again at the second stage (CFA model stage 2).

Table 5. Model Fit Indices in CFA Model Stage 1

Fit Index	Value	Threshold	Interpretation
Chi-square	1228.668	p < .001	Significant (not ideal)
Df	344	—	—
CFI	0.849	≥ 0.90	Below acceptable
TLI	0.834	≥ 0.90	Below acceptable
RMSEA	0.059	≤ 0.08	Adequate
SRMR	0.066	≤ 0.08	Acceptable

The model fit indices from the first-stage CFA (Table 5) indicate that the initial model did not meet optimal fit criteria. The values of CFI (.849) and TLI (.834) fell below the recommended cut-off threshold of ≥ .90 (Hu & Bentler, 1999), suggesting limited comparative and incremental fit. However, RMSEA (.059) and SRMR (.066) were within the range of moderate acceptability, indicating partial

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support for the model. These results imply that the CFA Model 1 requires modification to improve overall model adequacy.

CFA Model Stage 2

Following the removal of item AR21, the results of the second-stage CFA (Table 6) indicated improved factor loadings. All 27 remaining items showed statistically significant standardized loadings ($p < .001$), ranging from 0.264 to 0.785. Although some items, such as CI7, continued to display relatively low factor loadings, their empirical contributions to the CI construct remained acceptable within the overall model structure.

Table 6. Standardized Factor Loadings – CFA Model Stage 2 (after item 21 was removed)

Factor	Item	Estimate	S.E	P-Value
TU	TU1	0.559	0.031	<0.001
	TU2	0.603	0.035	<0.001
	TU3	0.677	0.029	<0.001
	TU4	0.749	0.024	<0.001
	TU5	0.585	0.039	<0.001
CI	CI6	0.606	0.026	<0.001
	CI7	0.476	0.031	<0.001
	CI8	0.692	0.025	<0.001
	CI9	0.740	0.027	<0.001
	CI10	0.715	0.023	<0.001
	CI11	0.704	0.024	<0.001
	CI12	0.678	0.024	<0.001
CG	CG13	0.657	0.025	<0.001
	CG14	0.520	0.041	<0.001
	CG15	0.664	0.027	<0.001
	CG16	0.655	0.023	<0.001
	CG17	0.669	0.028	<0.001
	CG18	0.682	0.024	<0.001
	CG19	0.632	0.030	<0.001
AR	AR20	0.593	0.027	<0.001
	AR22	0.589	0.030	<0.001
	AR23	0.532	0.032	<0.001
	AR24	0.585	0.029	<0.001
	AR25	0.785	0.020	<0.001
	AR26	0.766	0.020	<0.001
	AR27	0.700	0.025	<0.001
	AR28	0.639	0.028	<0.001

Note: All items have significant loading values and are more stable after the removal of item 21

In addition, the model fit indices presented in Table 7 indicate a meaningful improvement compared to the initial model. The CFI increased to 0.867 and the TLI to 0.854, approaching the recommended threshold for good model fit. Meanwhile, RMSEA (0.057) and SRMR (0.059) met the cutoff value of ≤ 0.08, indicating a relatively low level of residual error (Kline, 2023; Ximénez et al., 2022). These results suggest that the model's goodness-of-fit improved substantially following the removal of item 21.

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Table 7. Model Fit Indices in CFA Model Stage 2 (after item 21 was removed)

Fit Index	Value	Threshold	Interpretation
Chi-square	1073.012	p < .001	Significant (not ideal)
df	318	—	—
CFI	0.867	≥ 0.90	Improved, but not ideal
TLI	0.854	≥ 0.90	Improved, but not ideal
RMSEA	0.057	≤ 0.08	Better
SRMR	0.059	≤ 0.08	Acceptable

Note: The removal of item 21 resulted in improved values across all model fit indices.

Construct Validity and Reliability

Construct validity and reliability assessments were conducted to ensure that the measurement model of the Indonesian version of the SMC-CS possesses a sound and consistent factor structure. The evaluation focused on two core aspects: convergent validity and internal reliability of the four main constructs. Convergent validity was assessed using two indicators: standardized factor loadings and Average Variance Extracted (AVE). The analysis revealed that all items within the four constructs—Technical Usability (TU), Content Interpretation (CI), Content Generation (CG), and Affective Regulation (AR)—exhibited statistically significant factor loadings ($p < .001$), with most values exceeding 0.50. This indicates that each item reliably reflects the underlying latent construct being measured.

The AVE values across the four constructs ranged from 0.470 to 0.574. Three constructs, namely Content Interpretation, Content Generation, and Technical Usability met the commonly accepted AVE threshold of ≥ 0.50 as suggested by Hair Jr et al. (2021), while the remaining construct fell slightly below the cutoff, yet still within acceptable limits for early-stage validation efforts. AVE values slightly below the threshold of 0.50 indicate that the reliability of each construct with a value below 0.50 is not good. However, if the AVE value is less than 0.50, it is still acceptable provided that the CR value is higher than 0.60 and the convergent validity meets the requirements. The detailed values of AVE and Composite Reliability (CR) are presented in Table 8.

Table 8. Average Variance Extracted (AVE) and Composite Reliability (CR) per Construct

Construct	AVE	CR
TU	0.547	0.846
CI	0.574	0.908
CG	0.529	0.899
AR	0.470	0.837

The composite reliability estimates for the all four constructs showed acceptable reliability estimates ranging from 0.837 to 0.908, which exceed the minimum acceptable level of 0.70, often recommended as being sufficient to indicate good internal consistency (Hair Jr et al., 2021; Kline, 2023). This confirms the items of each construct measuring the same concept and having a high internal consistency.

The Indonesian SMC-CS version has acceptable validity and good internal consistency, shows an adequate construct validity and a good internal consistency. The AVE value of Affective Regulation

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was not higher than the suggested cut-of value, the high CR justified to retain the item in the model. The findings could provide robust evidence to whether the modified scale is capable to measure social media competence among Indonesian university students in a reliable and valid way.

DISCUSSION

This study aimed to adapt and validate the Social Media Competence Scale for College Students (SMC-CS) within the Indonesian language and cultural context. Cross cultural adaptation is a procedure of psychological instrument validation for other cultures so that it can be reliable and validated in a certain population. In the literature, it has been reported that simple literal translation is not sufficient for the preservation of psychometric properties, but that adaptation for context and language is required (Beaton et al., 2000; Cruchinho et al., 2024). The present findings can be interpreted step by step, beginning with the adaptation process that ensured conceptual and linguistic equivalence, followed by the evaluation of validity through expert judgment and confirmatory factor analysis, and finally by the estimation of reliability which confirmed the internal consistency of the scale (Çapik et al., 2018; Gómez-Lugo et al., 2016). Therefore the results from this research suggest that the construct of social media competence is reliable as a measure for the Indonesian context as seen from the global applications (Zhu et al., 2020).

In the initial analysis, the proposed four-factor model encountered several challenges in achieving optimal fit. Although the RMSEA and SRMR indices were within acceptable thresholds, the CFI and TLI fell below the recommended standards, suggesting that the model did not adequately capture the complexity of the construct (Xia & Yang, 2019). Rather than merely signaling statistical inadequacy, these findings point to the importance of evaluating how specific items may underperform when adapted to a different cultural and linguistic context (Byrne, 2016). A common strategy for model refinement involves examining the factor loadings of items and considering the removal of those that fail to function as valid indicators (Hu & Bentler, 1999; Kline, 2023). Such procedures are not only technical adjustments but also critical steps in ensuring that the instrument maintains conceptual coherence across cultural settings. As emphasized by (Cruchinho et al., 2024), refinement through item analysis strengthens construct validity, thereby enhancing the instrument's capacity to measure social media competence meaningfully in the Indonesian context.

Item AR21 from the Affective Regulation factor was identified as non-significant and exhibited a very low factor loading, thus warranting removal. In theory, affect regulation is a function of how individuals regulate their emotions during digital interactions, and this can be heavily influenced by culture (Bettis et al., 2022). In cross-cultural comparisons, it has been shown that emotional domains are characterized by high diversity, which needs to be taken into account in the trans-cultural adjustment of psychological measures (Byrne, 2016; Döveling et al., 2018). In the Indonesian context, challenges such as collectivist values, the importance of social harmony, and sensitivity to public image in online

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interactions may explain why certain affective regulation items function differently compared to other cultural settings (Dewi et al., 2018; Hutabarat, 2023). Thus, the deletion of this item can be considered not only a statistical refinement but also a culturally informed adjustment that enhances construct validity in the local context (Chae et al., 2018).

After the item was deleted, the model still had fit indices that approached the acceptability standard. This result is consistent with the literature, which says that the removal of problematic items could increase both reliability and validity (Putnick & Bornstein, 2016; Taherdoost, 2019). The 27-item final model provides a more stable and consistent coverage of the social media competence construct when adapted for Indonesian university students. Therefore, this model can be used with confidence for both research and practical application.

Although some items exhibited lower factor contributions, the overall internal reliability of each construct remained high. This indicates that even though there were items of varying quality, the constructs were measured consistently (Fornell & Larcker, 1981). In psychometric practice, the evaluation of reliability should be aligned with construct validity to ensure that the instrument is genuinely useful for field applications (Clark & Watson, 2019; Hair Jr et al., 2021).

In evaluating model fit, this study emphasized the RMSEA value as a primary indicator due to its robustness in assessing model adequacy, particularly for complex models and large sample sizes. RMSEA has the advantage of providing realistic error estimates and it takes into account model complexity (Kenny et al., 2015; Savalei et al., 2023). Various reports suggest that RMSEA should serve as a primary reference value when reporting CFA, as it is impervious to sample size effects and sensitive to model misspecification (Lai & Green, 2016; Savalei, 2018; Shi et al., 2019). Therefore, the favorable RMSEA achieved in this study provides strong evidence for the model's suitability.

The findings of this research have important theoretical as well as practical significance. Theoretically, this supports the idea of the complexity of the skills needed to manage categories of social media; technical, cognitive, creative, and affective (Polanco-Levicán & Salvo-Garrido, 2022; Zhu et al., 2020). The Indonesian version of this instrument can be used in the future for the higher education digital literacy development and intervention programs, so that the students will have better ability to face the threats and risks of social media (Indah et al., 2022; Pramukti et al., 2023). Additionally, the tool provides new possibilities for additional research and broader use in varied educational and social environments.

The findings of this research have important theoretical as well as practical significance. Theoretically, this supports the idea of the complexity of the skills needed to manage categories of social media; technical, cognitive, creative, and affective (Polanco-Levicán & Salvo-Garrido, 2022; Zhu et al., 2020). At the same time, by demonstrating that one affective regulation item failed to perform adequately in the Indonesian context, this study extends existing theory by showing that not all dimensions of social media competence operate uniformly across cultures (Briceño et al., 2023;

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Jankowski, 2019). This challenges the assumption of full cross-cultural generalizability and highlights the need to consider cultural nuances in conceptualizing digital competencies (Al-Sumait et al., 2024). The Indonesian version of this instrument can be used in the future for higher education digital literacy development and intervention programs, so that the students will have better ability to face the threats and risks of social media (Indah et al., 2022; Pramukti et al., 2023). Additionally, the tool provides new possibilities for additional research and broader use in varied educational and social environments.

CONCLUSION

Findings of this study present evidence for the validity and reliability of the Indonesian version of the SMC-CS as a tool to measure social media competence among Indonesian university students. The four-factor model—including technical usability, content interpretation, content generation, and affective regulation—consistently emerged after systematic cross-cultural adaptation and confirmatory factor analyses. Exclusion of items that did not meet validity standards improved model fit and measurement precision. As such, this instrument has the potential to provide useful information that supports research, evaluation, and the development of digital literacy programs in the Indonesian higher education environment, while adding relevant information to the measurement of digital competence in a context-specific manner.

Nevertheless, this study is not without limitations. The sample was drawn from a single cohort of university students, which may limit the generalizability of the findings to other age groups, regions, or professional contexts. In addition, the instrument was validated using self-report measures, which are susceptible to social desirability bias. Future research should therefore consider testing the instrument in more diverse samples, employing longitudinal designs to capture changes in competence over time, and integrating behavioral or performance-based measures of social media use. Such efforts will further strengthen the robustness of the instrument and broaden its applicability in both academic and non-academic settings.

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Appendix

Appendix 1. Translation Process of the SMC-CS Instrument

No	Original Item (English)	Translation 1 (Bahasa Indonesia)	Translation 2 (Bahasa Indonesia)	Back Translation (to English)
		Technical Usability (TU)		
1	I can create and manage my personal profile in social media environments.	Saya dapat membuat dan mengelola profil pribadi saya di lingkungan media sosial.	Saya bisa membuat dan mengelola profil pribadi di platform media sosial.	I can create and manage my personal profile on social media platforms.
2	I can use the hardware necessary to create social media contents.	Saya dapat menggunakan perangkat keras yang diperlukan untuk membuat konten media sosial.	Saya tahu cara menggunakan perangkat keras untuk membuat konten di media sosial.	I can use the hardware necessary to create content on social media.
3	I can use the software necessary to create social media contents.	Saya dapat menggunakan perangkat lunak yang diperlukan untuk membuat konten media sosial.	Saya tahu cara menggunakan perangkat lunak untuk membuat konten di media sosial.	I can use the software necessary to create content on social media.
4	I can use basic social media operating tools.	Saya dapat mengoperasikan alat dasar media sosial dasar.	Saya dapat menggunakan alat dasar media sosial.	I can operate basic tools for social media.
5	I know how to use social media search tools to gather information.	Saya tahu cara menggunakan alat pencarian media sosial untuk mengumpulkan informasi.	Saya tahu bagaimana cara menggunakan alat pencarian di media sosial untuk mencari informasi.	I know how to use social media search tools to gather information.
		Content Interpretation (CI)		
6	I am aware of potential information in social media.	Saya menyadari informasi potensial di media sosial.	Saya mengetahui potensi informasi yang ada di media sosial.	I am aware of potential information on social media.
7	I can notice inappropriate content in social media.	Saya dapat mengenal konten yang tidak pantas di media sosial.	Saya bisa mengenali konten yang tidak layak di media sosial.	I can identify inappropriate content on social media.
8	I can understand and interpret social media contents from the political, economic and social perspectives.	Saya dapat memahami dan menafsirkan konten media sosial dari perspektif politik, ekonomi, dan sosial.	Saya dapat menginterpretasi konten media sosial berdasarkan perspektif politik, ekonomi, dan sosial.	I can interpret social media content from political, economic, and social perspectives.
9	I can analyze the potential effects of social media contents on individuals.	Saya dapat menganalisis efek potensial dari konten media sosial pada individu.	Saya dapat menganalisis dampak konten media sosial terhadap individu.	I can analyze the potential effects of social media content on individuals.
10	I can compare news and information	Saya dapat membandingkan	Saya dapat membandingkan	I can compare news and information

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	across different social media environments.	berita dan informasi di berbagai lingkungan media sosial.	berita dan informasi di berbagai platform media sosial.	across different social media platforms.
11	I can evaluate the accuracy and validity of social media messages.	Saya dapat mengevaluasi keakuratan dan validitas pesan media sosial.	Saya bisa menilai kebenaran dan keabsahan pesan yang ada di media sosial.	I can evaluate the accuracy and validity of social media messages.
12	I can evaluate and consider social media's legal and ethical principles (copyright, human rights, privacy, etc.).	Saya dapat mengevaluasi dan mempertimbangkan prinsip-prinsip hukum dan etika media sosial (hak cipta, hak asasi manusia, privasi, dll.).	Saya dapat menilai dan mempertimbangkan prinsip hukum dan etika yang berlaku di media sosial (hak cipta, hak asasi manusia, privasi, dll.).	I can evaluate and consider social media's legal and ethical principles (copyright, human rights, privacy, etc.).
	Content Generation (CG)			
13	I can develop original, visual and textual social media content.	Saya dapat mengembangkan konten media sosial yang orisinal, visual dan tekstual.	Saya bisa membuat konten media sosial yang bersifat orisinal baik secara visual maupun tekstual.	I can develop original, visual, and textual social media content.
14	I can influence others' opinions when I participate in social media activities.	Saya dapat mempengaruhi pendapat orang lain ketika saya berpartisipasi dalam aktivitas media sosial.	Saya bisa mempengaruhi pendapat orang lain ketika beraktivitas di media sosial.	I can influence others' opinions when I participate in social media activities.
15	I can make contributions to social media by reviewing current events from different perspectives.	Saya dapat memberikan kontribusi ke media sosial dengan meninjau peristiwa terkini dari perspektif yang berbeda.	Saya bisa memberikan kontribusi melalui media sosial dengan menilai peristiwa terkini dari berbagai sudut pandang.	I can contribute to social media by reviewing current events from different perspectives.
16	I can collaborate and communicate with different social media users.	Saya dapat berkolaborasi dan berkomunikasi dengan pengguna media sosial yang berbeda.	Saya dapat bekerja sama dan berkomunikasi dengan berbagai pengguna media sosial.	I can collaborate and communicate with different social media users.
17	I can build a social networking identity that is consistent with my real personal characteristics.	Saya dapat membangun identitas jejaring sosial yang konsisten dengan karakteristik pribadi saya yang sebenarnya.	Saya dapat membangun identitas di jejaring sosial yang sesuai dengan karakter pribadi saya.	I can build a social networking identity that is consistent with my real personal characteristics.
18	I can have discussions and make comments to inform or guide people in the social media environment.	Saya dapat berdiskusi dan memberikan komentar untuk menginformasikan atau membimbing orang-orang di	Saya dapat berdiskusi dan memberi komentar untuk memberikan informasi atau panduan di media sosial.	I can have discussions and make comments to inform or guide people in the social media environment.

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		lingkungan media sosial.		
19	I can design and deliver social media contents that reflect critical thinking of certain matters.	Saya dapat merancang dan menyampaikan konten media sosial yang mencerminkan pemikiran kritis terhadap hal-hal tertentu.	Saya bisa merancang dan menyampaikan konten di media sosial yang mencerminkan pemikiran kritis mengenai isu-isu tertentu.	I can design and deliver social media content that reflects critical thinking of certain matters.
		Anticipatory Reflection (AR)		
20	I would not attack others when I comment or post on social media.	Saya tidak akan menyerang orang lain ketika saya berkomentar atau memposting di media sosial.	Saya tidak akan menyerang orang lain saat memberi komentar atau memposting di media sosial.	I would not attack others when I comment or post on social media.
21	I would use expletives to emphasize what I write in social media. (Reverse-worded item)	Saya akan menggunakan umpatan untuk menekankan apa yang saya tulis di media sosial.	Saya akan menggunakan kata kasar untuk menegaskan apa yang saya tulis di media sosial.	I would use expletives to emphasize what I write in social media.
22	I would participate in a discussion on social media only when I have knowledge of the subject area.	Saya akan berpartisipasi dalam diskusi di media sosial hanya jika saya memiliki pengetahuan tentang bidang tersebut.	Saya akan ikut serta dalam diskusi media sosial hanya bila saya memahami topik tersebut.	I would participate in a discussion on social media only when I have knowledge of the subject area.
23	I would raise different opinions in social media discussions only when I am convinced that my arguments are correct.	Saya akan mengemukakan pendapat yang berbeda dalam diskusi media sosial hanya ketika saya yakin bahwa argumen saya benar.	Saya akan menyampaikan pendapat yang berbeda dalam diskusi media sosial hanya jika saya yakin bahwa argumen saya benar.	I would raise different opinions in social media discussions only when I am convinced that my arguments are correct.
24	I would post comments in social media only when I am convinced that my views are correct.	Saya akan memposting komentar di media sosial hanya ketika saya yakin bahwa pandangan saya benar.	Saya akan memberikan komentar di media sosial hanya jika saya yakin pandangan saya tepat.	I would post comments in social media only when I am convinced that my views are correct.
25	I would consider the possible consequences before using social media to write something.	Saya akan mempertimbangkan konsekuensi yang mungkin terjadi sebelum menggunakan media sosial untuk menulis sesuatu.	Saya akan memikirkan konsekuensi yang bisa timbul sebelum menulis sesuatu di media sosial.	I would consider the possible consequences before using social media to write something.
26	I would consider whether my	Saya akan mempertimbangkan	Saya akan memikirkan apakah	I would consider whether my

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	comments will affect others' thoughts and emotions.	apakah komentar saya akan mempengaruhi pikiran dan emosi orang lain.	komentar saya bisa mempengaruhi pemikiran dan perasaan orang lain.	comments will affect others' thoughts and emotions.
27	I would think about whether other people might appreciate my contribution and comments in social media.	Saya akan memikirkan apakah orang lain akan menghargai kontribusi dan komentar saya di media sosial.	Saya akan mempertimbangkan apakah orang lain akan menghargai kontribusi dan komentar saya di media sosial.	I would think about whether other people might appreciate my contribution and comments in social media.
28	I would consider how other people might perceive my contribution before I write something in social media.	Saya akan mempertimbangkan bagaimana orang lain dapat melihat kontribusi saya sebelum saya menulis sesuatu di media sosial.	Saya akan memikirkan bagaimana pandangan orang lain terhadap kontribusi saya sebelum menulis sesuatu di media sosial.	I would consider how other people might perceive my contribution before I write something in social media.

Appendix 2. Final Version of the Indonesian SMC-CS Instrument (after Removal of Item 21)

No	Final Item (Indonesian)
	Technical Usability (TU)
1	Saya dapat membuat dan mengelola profil pribadi saya di lingkungan media sosial.
2	Saya dapat menggunakan perangkat keras yang diperlukan untuk membuat konten media sosial.
3	Saya dapat menggunakan perangkat lunak yang diperlukan untuk membuat konten media sosial.
4	Saya dapat mengoperasikan alat dasar media sosial dasar.
5	Saya tahu cara menggunakan alat pencarian media sosial untuk mengumpulkan informasi.
	Content Interpretation (CI)
6	Saya menyadari informasi potensial di media sosial.
7	Saya dapat mengenal konten yang tidak pantas di media sosial.
8	Saya dapat memahami dan menafsirkan konten media sosial dari perspektif politik, ekonomi, dan sosial.
9	Saya dapat menganalisis efek potensial dari konten media sosial pada individu.
10	Saya dapat membandingkan berita dan informasi di berbagai lingkungan media sosial.
11	Saya dapat mengevaluasi keakuratan dan validitas pesan media sosial.
12	Saya dapat mengevaluasi dan mempertimbangkan prinsip-prinsip hukum dan etika media sosial (hak cipta, hak asasi manusia, privasi, dll.).
	Content Generation (CG)
13	Saya dapat mengembangkan konten media sosial yang orisinal, visual, dan tekstual.
14	Saya dapat mempengaruhi pendapat orang lain ketika saya berpartisipasi dalam aktivitas media sosial.
15	Saya bisa memberikan kontribusi ke media sosial dengan meninjau peristiwa terkini dari perspektif yang berbeda.
16	Saya dapat bekerja sama dan berkomunikasi dengan berbagai pengguna media sosial.
17	Saya dapat membangun identitas jejaring sosial yang konsisten dengan karakteristik pribadi saya yang sebenarnya.
18	Saya dapat berdiskusi dan memberikan komentar untuk menginformasikan atau membimbing orang-orang di lingkungan media sosial.
19	Saya dapat merancang dan menyampaikan konten media sosial yang mencerminkan pemikiran kritis terhadap hal-hal tertentu.
	Anticipatory Reflection (AR)

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20	Saya tidak akan menyerang orang lain ketika saya berkomentar atau memposting di media sosial.
22	Saya akan berpartisipasi dalam diskusi di media sosial hanya jika saya memiliki pengetahuan tentang bidang tersebut.
23	Saya akan mengemukakan pendapat yang berbeda dalam diskusi media sosial hanya ketika saya yakin bahwa argumen saya benar.
24	Saya akan memposting komentar di media sosial hanya ketika saya yakin bahwa pandangan saya benar.
25	Saya akan mempertimbangkan konsekuensi yang mungkin terjadi sebelum menggunakan media sosial untuk menulis sesuatu.
26	Saya akan mempertimbangkan apakah komentar saya akan mempengaruhi pikiran dan emosi orang lain.
27	Saya akan memikirkan apakah orang lain akan menghargai kontribusi dan komentar saya di media sosial.
28	Saya akan mempertimbangkan bagaimana orang lain dapat melihat kontribusi saya sebelum saya menulis sesuatu di media sosial.