

Measuring What IMF Manages: A Design-Science Protocol for an Indicator Set and Maturity Model for CreatiCampus Projects

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Abstract

Indicator Measurement Factor Analysis (IMF) is a spreadsheet-based method for running projects that has been used at an Indonesian private university since 2019. Its founding texts claim that it monitors achievement and improves teamwork, but they report no measurement instrument, and the achievement percentage computed in practice is defined in more than one way. This paper reframes IMF as a measurement instrument for creative-campus projects and sets out, following design science research, the design of that instrument and the protocol for validating it. We first review how IMF has been described and measured in its founding blog post and conference paper, in the literature that cites the paper and in the formulas of live IMF spreadsheets. We then propose a new measurement definition of IMF and design two artefacts: the IMF Indicator Set, with twenty indicators in six domains (achievement, timeliness, evidence integrity, ownership and collaboration, teamwork, and continuity), each with a formula, data source and direction; and the IMF Maturity Model, which places a project unit on five levels across six dimensions, from ad hoc task lists to portfolio-level optimisation. An illustrative computation on an invented mission demonstrates how the indicators are calculated. Validation is planned in three phases: a modified Delphi study with a multidisciplinary expert panel, content-validity indexing at item and scale level together with model-level evaluation of the maturity model and cognitive interviews on the teamwork items, and a pilot with creative-campus missions to examine reliability, feasibility, sensitivity and known-groups validity. No empirical results are reported; every result is marked as to be reported, and decision criteria are fixed in advance.

Keywords: Indicator Measurement Factor Analysis; IMF; design science research; measurement instrument; indicator set; maturity model; Delphi; content validity index; creative campus; creative economy

1. Introduction

1.1 A Method That Measures but Has Not Been Measured

Indicator Measurement Factor Analysis (IMF) carries measurement in its name. Introduced at Universitas Raharja in 2019, it asks every project to declare its objectives, outputs and contributors and to track achievement in a shared spreadsheet. Its two founding texts, a blog post and a conference paper, present it as a simple, low-cost way of implementing the classical management functions of planning, organising, actuating and controlling (POAC). The paper claims that IMF produces effective results in “communication, collaboration, critical thinking, competition, and creativity of teamwork” and that user satisfaction was “collected and analysed”. Yet neither text reports a measurement instrument, a sample or a result. The method that measures projects has not itself been measured.

This gap matters more now than when IMF was introduced. Universities in Indonesia are being asked to contribute to the creative economy, and the national creative-economy master plan

for 2026 to 2045 names better creative-economy data among its priority programmes. Campus projects that turn ideas into prototypes, creative startups, papers and events are a natural source of such data, but only if their outputs are counted in a consistent and verifiable way. Studies of campus information systems have long stressed that integrated data must be accurate, transparent, accountable and current [1], and grant-monitoring research shows that fragmented tracking leads to ineffective supervision and delayed decisions [2,3]. If IMF is to serve as the routine through which creative-campus projects are run, it also needs to serve as the instrument through which they are measured.

1.2 Three Problems of Measurement in IMF

Three problems stand in the way. The first is definitional. The achievement percentage that IMF computes, called Capaian in the sheets, is defined differently from one sheet to another: sometimes as the sum of task achievement divided by the number of planned outputs, sometimes divided by the total of planned and extra outputs, and sometimes as an average. Because extra outputs can be counted against the planned target, values above 100 percent occur. Two missions with the same Capaian may therefore have achieved quite different things.

The second problem is coverage. IMF records outputs and dates very well, but the claims made for it go further: to teamwork, motivation and the quality of collaboration. None of these is measured in the sheets, and the five teamwork qualities named in the founding paper have never been operationalised.

The third problem is level. IMF measures missions, but a university that wants to use IMF across many creative-campus projects needs to know how well a unit uses the method: whether it declares outputs before work begins, whether it links evidence, whether it closes its missions and whether it learns from them. That is a question of maturity, not of a single mission's score.

1.3 Aim, Research Questions and Approach

This paper addresses these problems by reframing IMF as a measurement instrument and by designing, following design science research, two artefacts and the protocol for validating them. It responds to the brief that motivated this series in three steps: it reviews how IMF has been described and measured by others; it proposes a new measurement definition and usage of IMF; and it argues that IMF, measured in this way, is an essential tool for building creative-campus projects. Three research questions guide the work.

RQ1. How have the founding texts, the citing literature and the practice of IMF described and measured project achievement?

RQ2. What indicator set and maturity model can operationalise IMF as a measurement instrument for creative-campus projects?

RQ3. How should the indicator set and maturity model be validated before they are used for decisions?

The first question is answered by review. RQ2 is answered by design, and an illustrative computation demonstrates the artefacts. RQ3 is answered by a validation protocol whose decision criteria are fixed in advance. Consistent with that protocol, the paper reports no empirical results: every result of validation is marked as to be reported.

1.4 Contributions and Structure

The paper contributes a measurement-oriented review of IMF, a new definition of IMF as a measurement instrument, an indicator set of twenty indicators in six domains, a five-level maturity model across six dimensions and a pre-specified validation protocol. Two companion papers in this

working-paper series address IMF from other angles: one analyses and redefines the concept [4], and one specifies IMF as an operating system for creative-campus projects. This paper draws on their construct dimensions and rules where noted but can be read on its own.

Section 2 reviews how IMF has been described and measured. Section 3 explains the research design. Section 4 proposes the measurement definition and the measurement model. Section 5 presents the indicator set and Section 6 the maturity model. Section 7 demonstrates both on an invented mission. Section 8 sets out the validation protocol and the results to be reported. Section 9 discusses why measurement makes IMF essential for creative-campus projects and the limits of the design, and Section 10 concludes.

2. How IMF Has Been Described and Measured

2.1 The Founding Texts

The blog post “Why IMF?”, dated 26 June 2019 and written by N. Lutfiani on the blog of U. Rahardja (archived at <https://web.archive.org/web/2024/https://untungrahardja.ilearning.me/2019/06/26/why-imf/>), credits the innovation to U. Rahardja and presents IMF as a method for completing information-technology projects by focusing on POAC. Its instruction is that every project must have objectives (Tujuan), outputs (Luaran) and contributors, whose performance is measured with a spreadsheet. As proof of benefit it says, in our translation, that IMF lets one see continuously the progress of every project, from the best-performing contributor to the lowest contribution. Measurement, in the blog’s account, means continuous visibility of progress and of individual contribution.

The 2020 conference paper by Sudaryono, U. Rahardja and N. Lutfiani (J. Phys.: Conf. Ser. 1477, 032023, doi:10.1088/1742-6596/1477/3/032023) is more specific. It describes an IMF as a Viewboard, a header showing the project’s title, objectives, outcomes, contributors, version and due date, and a Content grid in which “each contributor can complete the task with a percentage achievement and a unique code on each project”. The Viewboard combines spreadsheet functions such as AVERAGE, MAX and HLOOKUP, and the paper prints three example formulas. It also offers “one simple algorithm used in implementing IMF”, but the formula’s subscripts are rendered as broken glyphs in the published file, so its exact notation cannot be recovered; it reads as an average of indicator scores, but that is an interpretation. The paper claims effects on teamwork and reports that user satisfaction was collected and analysed, without giving an instrument or results.

Three features of the founding texts shape the present design. They make achievement against declared outputs the core measure. They attach that measure to named contributors. And they assert, without evidence, effects on teamwork qualities. The first two are measurable from IMF records; the third requires a separate instrument.

2.2 The Citing Literature

The literature that cites the 2020 paper offers little help. OpenAlex lists 49 citing records, which reduce to 46 distinct works once duplicates are merged. Our reading of the sixteen open-access works among them that appear in the publisher network most closely connected with the method’s home institution found that none describes, applies, critiques or extends IMF, and none measures anything with it; most cite it in sentences with no evident link to project management or measurement. The companion concept analysis reports these findings in detail [4]. It also found that half of the coded citing works omitted the paper’s first author, and that practice, unlike print, has added countable output targets, task codes, evidence links, countdowns, closing rules and recognition. For the purposes of this paper the conclusion is simple: there is no published secondary measurement of IMF on which to build.

2.3 Measurement in Practice

The practice of IMF is more informative. We examined, in read-only mode and without extracting personal data, the structure and formulas of live spreadsheets titled “IMF ...” covering research grants, publication campaigns, paper-processing batches, teaching programmes, events and multi-team sprints. Their measurement logic is consistent in kind but varies in detail. Because the sheets use Indonesian and IMF-specific terms, Table 11 in Appendix B gives a short glossary.

Output counts are computed from the Content grid. Luaran Target counts the coded tasks in the planned section, Luaran Extra counts those in an extra section, and Luaran Total adds the two. Task achievement is binary in most sheets, a ticked checkbox counting as 100 percent, and fractional in some, where a task with several required artefacts scores the share of artefacts present. Capaian is then computed as the sum of task achievement divided by Luaran Target or by Luaran Total, or as an average. Because the denominator varies and extra tasks may count against the target, Capaian can exceed 100 percent.

Time is measured by a countdown formula that shows the days remaining or the word “Finish”, by a done date, by a count of days finished early and by a closing flag that reads “CLOSING” once a done date is entered and “NOT CLOSING” otherwise. Contribution is measured by assigning each row to a person in charge (PIC) and, in multi-team files, a lead person in charge (LPIC), and by cells that name the most valuable lead and task owners. Multi-team files roll up target, completed and remaining items per team. Grant files count submissions by type. Evidence is recorded by a link, usually labelled “Disini” (“here”), in a notes cell.

Two further features bear on measurement indirectly. Formula-generated opening and closing sentences, beginning with “Bismillah” and “Alhamdulillah”, read the live numbers back as prose and state the percentage achieved and the days finished early. And versioning varies: the 2020 paper describes monthly versions, while one multi-team IMF opens a new tab for each sprint of about two weeks. Table 1 summarises what is measured in the founding texts and in practice, and what is not measured at all.

Table 1. What is measured in IMF’s founding texts and practice, and what is not measured

Aspect	Founding texts	Practice sheets	Not measured
Achievement	Percentage achievement per task; an average-type “simple algorithm” whose notation cannot be recovered	Capaian as sum of task status over Luaran Target or Luaran Total, or as an average; can exceed 100 percent	A single, fixed definition
Outputs	Outcomes listed on the Viewboard	Luaran Target, Extra and Total; counts by submission type in grant files	Output type linked to creative-economy recognition
Time	Due date; monthly versions	Countdown, done date, days finished early, CLOSING / NOT CLOSING flag; sprint tabs	Closing rate across versions; lateness
Contribution	Named contributors; best to lowest contributor (blog)	PIC and LPIC per row; most-valuable cells; team roll-ups	Spread of contribution; partner roles
Evidence	Unique task codes	Evidence link in notes cell	Coverage and independent verification
Teamwork	Effects on five teamwork qualities claimed	League and medal language in one case	Any perception of teamwork
Satisfaction	Said to be collected and analysed	Not recorded	Instrument and results
Unit practice	Not addressed	Varies by sheet	Maturity of IMF use

2.4 Measurement and Maturity in the Wider Literature

Indonesian research on project and organisational measurement provides the building blocks for an IMF instrument. Earned-value management compares work performed with work planned to evaluate cost and schedule performance in construction projects [5], and cost-performance indices and variance analysis have been used to evaluate cost efficiency in service contracts [6]. Dashboards have been designed to monitor teacher-performance assessments [7], and business-intelligence charts have been used to present advisor attendance data so that it no longer has to be compared table by table [8]. Structural frameworks for time management combine prioritisation, scheduling, delegation and technology [9], and studies of management and monitoring stress that strong monitoring lets organisations assess the effectiveness of initiatives and identify areas for improvement [10].

Maturity models are a second building block. A project-management maturity assessment was used to understand why an information-technology consultancy finished twelve of fourteen projects late and to formulate directed improvements [11]. Maturity measurement has also been applied to business processes [12], to information-technology governance using an audit framework [13], to risk management in state-owned holding companies [14,15] and to the digital readiness of small enterprises, where the absence of a contextual and measurable framework was itself identified as a constraint [16]. A systematic review of digital maturity across Indonesian industries reports uneven maturity driven by differences in infrastructure, skills, leadership and strategic alignment [17]. These studies show both the appeal of maturity models, which give organisations a staged path to improvement, and their dependence on clear, context-specific criteria.

A third building block is instrument validation. Campus studies routinely use established instruments, such as the System Usability Scale and the User Experience Questionnaire [18] or extended technology-acceptance models [19], and structural equation modelling with SmartPLS is widely used to evaluate organisational performance, startup collaboration and publication management [20,21,22]. Development research tests the feasibility and effectiveness of new educational products [23], and a new campus incubator model was evaluated for practicality and effectiveness with experts and tenants [24]. Cross-cultural measurement of the humanistic effects of technology on happiness shows the care needed when constructs travel across contexts [25].

A final strand is caution. A review of research-impact evaluation tools discusses the myths surrounding metrics and the malpractice they can provoke [26], and a study of faculty members shows how performance parameters can become a source of stress that harms the work they are meant to improve [27]. Humanistic approaches to technology in higher education argue for balancing digital advancement with human values [28,29]. Any instrument for IMF must therefore measure what matters without turning measurement into pressure.

2.5 Implications for Design

The review yields four design implications. First, the core measure of IMF, achievement against declared outputs, needs a single definition with a fixed denominator. Second, the instrument should exploit what IMF already records, namely outputs, dates, owners, evidence and versions, so that most indicators can be computed without extra data collection. Third, the teamwork claims of the founding paper require a separate, short perception instrument, because they cannot be read from the sheets. Fourth, a maturity model is needed to assess how well a unit uses IMF, and it must be specific to IMF rather than borrowed from general project management.

3. Research Design

3.1 Design Science Research

The study follows design science research, which develops and evaluates artefacts that solve identified problems. We use the six activities of the design science research methodology described by Peffers and colleagues: problem identification and motivation, definition of the objectives of a solution, design and development, demonstration, evaluation and communication. Figure 1 shows how the activities are carried out in this paper and which outputs are reported now and which are to be reported.

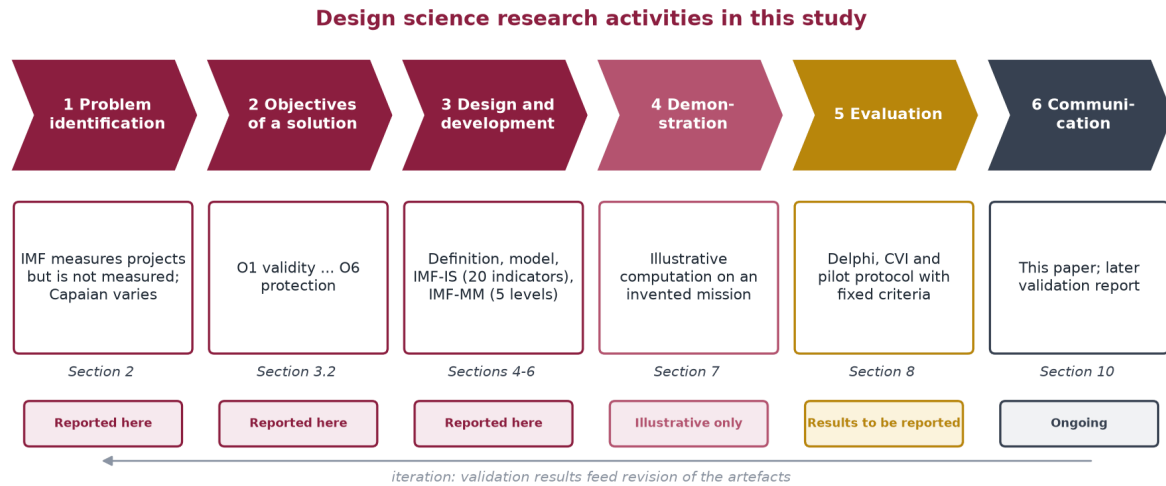


Figure 1. Design science research activities in this study, with the section where each is carried out and its reporting status: problem identification, objectives and design are reported here, demonstration is illustrative only, and evaluation results are to be reported.

The first three activities are completed in this paper. Problem identification draws on the review in Section 2. The objectives of a solution are stated in Section 3.2. Design and development produce the measurement definition and model (Section 4), the indicator set (Section 5) and the maturity model (Section 6). Demonstration is carried out by an illustrative computation on an invented mission (Section 7); it shows how the artefacts work but is not evidence of their validity. Evaluation is specified as a validation protocol (Section 8) whose results are to be reported. Communication is the present paper and the subsequent report of validation. The process is iterative: an indicator or item that fails its content-validity criterion, a formula that produces rater disagreement because of a definitional gap, or a maturity criterion that experts judge unclear returns the artefact to design and development, as the arrow at the foot of Figure 1 indicates.

This structure is common in development research on campus products, which typically moves from design to expert review to field testing [23, 24]. It is also consistent with how maturity models are usually built, by defining dimensions and levels from the literature and practice and then refining them with experts and pilots [11, 16].

3.2 Objectives of the Solution

From the review we derive six objectives that the instrument must meet. O1, validity: each indicator must measure a clearly defined aspect of IMF use or IMF outcomes. O2, unambiguity: each indicator must have one formula, one data source and one direction of improvement. O3, parsimony: most indicators must be computable from existing IMF records, and any additional data collection must take a team no more than a few minutes per version. O4, comparability: indicators must be comparable across missions, versions and units. O5, actionability: each indicator and each maturity level must point to something a team or unit can change. O6, protection: the instrument must not expose individuals unnecessarily or create pressure that undermines

voluntary effort, and its use must respect Law No. 27 of 2022 on Personal Data Protection.

3.3 Sources and Design Inputs

The design draws on four inputs: the founding texts and the practice sheets reviewed in Section 2; the construct dimensions of IMF proposed in the companion concept analysis, namely mission declaration, indicator decomposition, accountable contribution, evidence-verified measurement, temporal rhythm, and meaning and recognition; the rules proposed in the companion operating-system paper, in particular declaring outputs before work begins, counting a task only with evidence and reporting planned achievement and extra output separately; and the measurement and maturity literature reviewed in Section 2.4. Where an indicator or level descriptor departs from practice, we say so. Table 10 in Appendix A traces each indicator domain and maturity dimension to its sources and to the objectives it serves, and labels each element as documented in the founding texts, observed in practice, adopted from the companion papers or newly proposed here. Of the six indicator domains, only achievement and timeliness rest mainly on documented or observed practice; evidence integrity, ownership and collaboration, and continuity extend observed practice with new indicators; and the teamwork domain is newly operationalised from a list in the founding paper.

3.4 Ethics

The design work used published documents and the structure of spreadsheets accessed read-only; no personal data were extracted and no human participants were involved. The validation protocol in Section 8 involves human participants and will require ethical approval and informed consent before it begins.

4. IMF as a Measurement Instrument

4.1 A New Measurement Definition

The founding texts define IMF as a method and a set of tools. The companion papers in this series define it as a construct of six dimensions and as an operating system of layers and rules. For measurement purposes a further definition is needed, one that says what IMF measures, from which data and at which level. We propose the following.

As a measurement instrument, IMF is a structured set of indicators, computed mainly from a mission's Viewboard and Content records and supplemented by short team ratings, that quantifies how fully, how promptly, how verifiably and how collaboratively a declared mission achieved its outputs, and that places the unit running such missions on a five-level scale of IMF maturity.

The definition has five parts. A structured set of indicators means that IMF yields a profile of separate measures, not a single score. Computed mainly from records means that most indicators reuse what the sheets already hold, which meets the parsimony objective. Short team ratings means that the teamwork qualities claimed by the founding paper are measured by perception, not inferred from output counts. The four adverbs, fully, promptly, verifiably and collaboratively, name the outcome domains. And the five-level scale of maturity adds the unit level that the review found missing.

4.2 What Changes in Usage

The definition changes how IMF is used in three ways. First, the achievement percentage becomes one indicator among several, with one fixed definition, instead of the single number on which a mission is judged. Second, each mission produces a short profile at every closing, which can be compared across versions and aggregated across missions. Third, units are periodically assessed for maturity, so that improvement efforts target the weakest practice, not the lowest score.

This shift parallels the move in project control from tracking whether work is done to tracking how performance compares with plan, as in earned-value analysis [5,6]. It also follows monitoring research that treats evaluation as a means of identifying areas for improvement [10] and quality-assurance approaches that combine clear outcomes with continuous improvement [30].

4.3 The Measurement Model

Figure 2 shows the measurement model. Its inputs are three kinds of data: records in the Viewboard and Content grid, which provide declared targets, codes, owners, dates, statuses and evidence links; a short team questionnaire completed at closing; and, for maturity assessment, a record audit and a self-assessment checklist. From these, twenty indicators are computed in six domains. At mission level the indicators form the IMF Mission Profile. Across missions, unit-level summaries and the maturity assessment form the IMF Unit Profile, which can in turn be aggregated across units into a portfolio view.

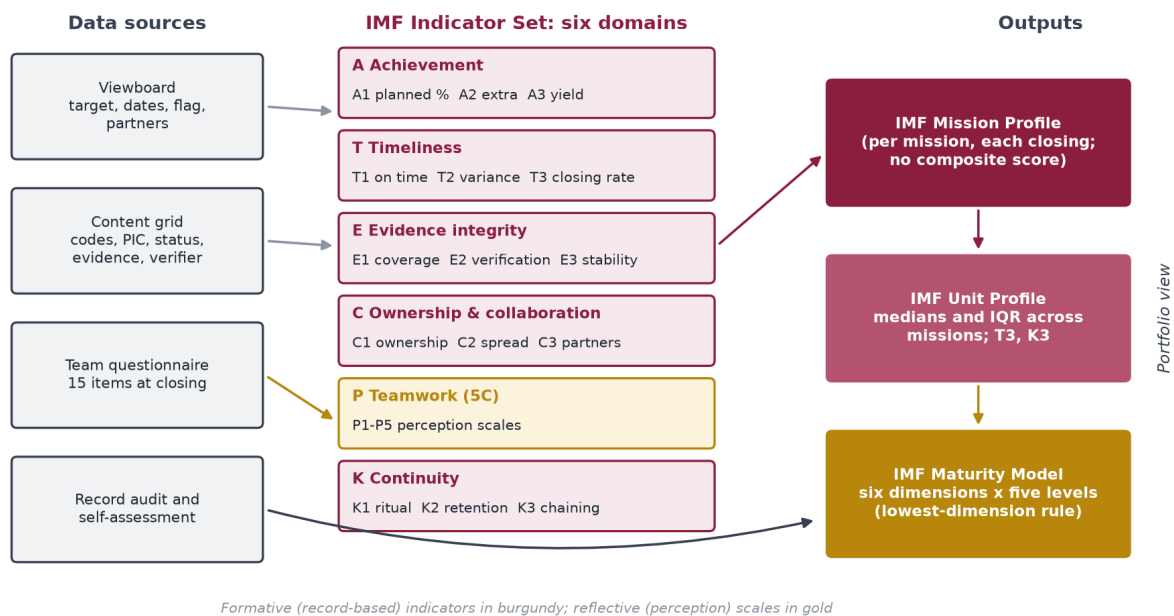


Figure 2. The IMF measurement model: Viewboard and Content records, a short team questionnaire and a record audit feed twenty indicators in six domains, which form the Mission Profile, the Unit Profile and, with the audit, the maturity assessment.

The model distinguishes reflective and formative logic. The five teamwork indicators are perceptions of underlying qualities and are measured reflectively, by several items each, so that internal consistency can be examined. The record-based indicators are formative: each is a direct count or ratio, and together they describe performance without assuming a single latent trait. The maturity model is a staged assessment, and its levels are defined by criteria, not by scores. Keeping these logics apart prevents the common error of averaging unlike quantities. Whether the founding paper’s “simple algorithm” does this cannot be determined, because its notation is unrecoverable; we note only that an average across unlike indicators is one possible reading and that the present design avoids it.

4.4 Units of Analysis

Three units of analysis are used. The task is the coded row in the Content grid; it is the unit at which evidence and ownership are recorded. The mission is the declared set of outputs with one objective, a team and a due date, usually one IMF sheet or one version tab; it is the unit at which the Mission Profile is computed. The unit is the organisational entity that runs missions, such

as a study programme, a research centre, an incubator or a student community; it is the unit at which maturity is assessed. A version, the time-boxed period after which a new tab or sheet is opened, links missions over time.

5. The IMF Indicator Set

5.1 Overview

The IMF Indicator Set (IMF-IS) contains twenty indicators in six domains: achievement (A), timeliness (T), evidence integrity (E), ownership and collaboration (C), teamwork perceptions (P) and continuity (K). Table 2 lists each indicator with its formula, data source and direction of improvement. All formulas refer to a single mission at closing unless otherwise stated. Twelve of the twenty indicators can be computed from existing IMF records or version history; three, independent verification, declaration stability and partner engagement, require small additions to the sheet; and the five teamwork indicators require a questionnaire.

Table 2. The IMF Indicator Set (IMF-IS): twenty indicators in six domains

Code	Indicator	Formula (per mission at closing unless stated)	Source	Better
A1	Planned achievement	Verified planned outputs / declared target x 100 (fractional task scores allowed if declared)	Content, Viewboard	Higher
A2	Extra output	Count of verified extra outputs (never added to A1)	Content	Context
A3	Output yield by type	Counts of verified prototypes, papers submitted and accepted, startups registered, events held, IP applications or recordings	Content	Higher
T1	On-time closing	1 if closed on or before due date, else 0	Viewboard	1
T2	Schedule variance	Due date minus done date, in days (positive = early)	Viewboard	Not negative
T3	Version closing rate	Versions formally closed / versions opened in period (unit level)	Version tabs	Higher
E1	Evidence coverage	Counted tasks with working evidence link / counted tasks	Content notes	Higher
E2	Independent verification	Counted tasks confirmed by a non-producer / counted tasks	Verifier column (added)	Higher
E3	Declaration stability	1 - (target changes after opening / declared target), floored at 0	Change log (added)	Higher
C1	Ownership coverage	Task rows with named PIC / task rows	Content	Higher
C2	Contribution spread	Contributors owning at least one verified task / listed contributors	Content, Viewboard	Higher
C3	Partner engagement	Distinct external actor types (of six) with a declared role	Partner field (added)	Higher
P1	Communication	Mean of three items, 1 to 5	Questionnaire	Higher
P2	Collaboration	Mean of three items, 1 to 5	Questionnaire	Higher
P3	Critical thinking	Mean of three items, 1 to 5	Questionnaire	Higher
P4	Constructive competition	Mean of three items, 1 to 5	Questionnaire	Higher
P5	Creativity of teamwork	Mean of three items, 1 to 5	Questionnaire	Higher
K1	Closing-ritual completion	1 if opening and closing statements present and consistent with final numbers, else 0	Viewboard	1
K2	Contributor retention	Contributors of version v who contribute in v+1 / contributors of v	Version tabs	Context

Code	Indicator	Formula (per mission at closing unless stated)	Source	Better
K3	Mission chaining	Closed missions seeding a declared follow-on mission / closed missions (unit level)	Portfolio	Higher

5.2 Achievement

The achievement domain fixes the definitional problem identified in Section 1.2. Following the two-number rule of the companion operating-system paper, planned achievement (A1) is the number of verified planned outputs divided by the declared target, expressed as a percentage. Extra outputs are counted separately (A2) and never enter the denominator or the numerator of A1. A1 therefore cannot exceed 100 percent, and two missions with the same A1 have achieved the same share of what they declared. Where a task has several required artefacts and is scored fractionally in practice, the fraction is retained in the numerator, but the scoring rule must be declared on the Viewboard before work begins.

Output yield (A3) counts verified outputs by type: prototypes, submitted and accepted papers, registered startups, events held and intellectual-property applications or recordings. It connects mission measurement to the outputs that creative-economy policy recognises. Law No. 24 of 2019 on the Creative Economy provides for intellectual-property-based financing and for facilitation of intellectual-property registration, and Government Regulation No. 24 of 2022 allows intellectual property to be used as collateral when it is backed by a certificate or recording letter. Counting such outputs by type makes the creative-campus contribution visible in the terms these instruments use. Yield should be reported as counts, not weighted into a composite, until the validation in Section 8 shows whether and how weighting is warranted. Each type needs a counting rule, which we propose as a default for expert review. A paper is counted once as submitted, on evidence of a submission receipt, and again as accepted, on evidence of an acceptance letter, in separate columns. A startup is counted as incubated when it is formally admitted to a campus or external incubation programme and as established when it obtains a legal business identity; these are separate counts, and neither is counted on the basis of a pitch alone. Intellectual-property outputs are counted by kind: copyright recordings and applications for patents, industrial designs or trademarks are reported separately, and applications are distinguished from granted certificates or issued recording letters, because only the latter meet the collateral condition of the 2022 regulation. An event is counted when it has taken place, on evidence of an agenda and attendance record.

5.3 Timeliness

Timeliness reuses the countdown, done date and closing flag already present in IMF sheets. On-time closing (T1) takes the value 1 if the mission is closed on or before its due date and 0 otherwise. Schedule variance (T2) is the due date minus the done date in calendar days, so positive values mean early completion, as in the sheets' count of days finished early, and negative values mean late completion. Version closing rate (T3) is a unit-level indicator: the share of versions opened in a period that were formally closed. Together they distinguish a unit that closes late from one that does not close at all, a distinction that the single closing flag hides. Time-management research suggests that prioritisation and scheduling techniques can shorten completion times [9], and the timeliness domain provides the data to test whether such techniques work in IMF missions.

5.4 Evidence Integrity

Evidence integrity addresses whether counted outputs can be verified. Evidence coverage (E1) is the share of counted tasks whose notes cell contains a working link to the artefact. Independent verification (E2) is the share of counted tasks confirmed by someone other than the person who produced them, such as the lead person in charge or a mentor; it requires a small addition to the

sheet, a verifier column. Declaration stability (E3) is one minus the number of changes to the declared target after the mission opened, divided by the declared target, floored at zero; it requires the sheet to log target changes, which version history can supply. E3 guards against the easiest way of raising A1, which is to lower the target. Responsibility for the additions is assigned to roles that already exist: the lead person in charge or mentor fills the verifier column when confirming a task, the change log is generated from the spreadsheet's version history or by a single dated note when the target changes, and the partner field is completed once at opening. In a template with these columns built in, the additional effort should amount to a few seconds per verified task and a few minutes per mission; the pilot measures whether this holds. Evidence integrity echoes the information-systems emphasis on accurate, accountable data [1] and the transparency aims of grant-monitoring platforms [2, 3].

5.5 Ownership and Collaboration

Ownership coverage (C1) is the share of task rows with a named person in charge. Contribution spread (C2) is the share of listed contributors who own at least one verified task; it shows whether a mission's achievement rests on a few people or on the whole team, which is the progress view from best performer to lowest contribution that the blog post promised, expressed without ranking individuals publicly. Partner engagement (C3) counts the distinct types of external actor, among academia, business, community, government, media and finance, that hold a declared role in the mission. It operationalises the multi-actor collaboration that creative-economy policy calls hexa-helix synergy and that campus studies of penta-helix entrepreneurship ecosystems describe [31]. Studies of startup collaboration and incubation stress the role of partners and stakeholders in success [21, 32].

5.6 Teamwork Perceptions

The founding paper lists communication, collaboration, critical thinking, competition and creativity of teamwork as the qualities IMF improves. We refer to them as the 5C for brevity; the label is ours and does not appear in the founding texts. Because the qualities are perceptions of how a team worked, they are measured by a short questionnaire completed by team members at closing. Table 3 gives the draft item pool, three items per quality, rated on a five-point agreement scale anchored at 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree) and 5 (strongly agree). Indicators P1 to P5 are the mean item scores per quality, averaged over respondents. Three items is the minimum at which the internal consistency of a reflective scale can be examined, and it keeps the questionnaire to fifteen items. To protect anonymity, teamwork scores are reported only for missions with at least three respondents and, outside the team, only in aggregate across missions.

Table 3. Draft item pool for the five teamwork qualities (5C), for expert review and cognitive interviews; not yet tested

Quality	Item 1	Item 2	Item 3
Communication (P1)	Team members kept each other informed about progress on their tasks.	When problems arose, they were raised early and openly.	I knew what other members were working on.
Collaboration (P2)	Team members helped one another to complete tasks.	Outputs depended on combining the work of several members.	Members shared resources and skills when others needed them.
Critical thinking (P3)	The team questioned whether its outputs met the declared objective.	Decisions were based on evidence rather than habit.	The team reviewed the evidence for each output before counting it.

Quality	Item 1	Item 2	Item 3
Constructive competition (P4)	Seeing others' progress motivated me to improve my own work.	Comparison with others did not stop us from helping each other.	Friendly comparison between teams made the work more engaging.
Creativity of teamwork (P5)	The team generated new ideas for reaching its outputs.	New ideas proposed by members were tried during the mission.	The team found better ways of working as the mission progressed.

Two interpretive choices are made explicit. Competition is reinterpreted as constructive competition, meaning that comparison with peers motivates effort without undermining help, because IMF practice uses league and medal language, but no formal reward rule exists and unchecked competition could harm collaboration. Creativity of teamwork is measured as the team's perceived generation and use of new ideas during the mission, not as the creativity of its outputs. The items are drafts for expert review; they have not been tested. Before the pilot they will also be examined in cognitive interviews with five to eight prospective respondents, who will be asked to think aloud while answering and to paraphrase each item, so that items understood differently from their intent can be reworded. The design draws on research linking project-based and interdisciplinary learning with collaboration and innovation skills [33,34] and on studies of creativity in information-technology entrepreneurship education [35].

5.7 Continuity

The continuity domain captures what makes IMF more than a checklist. Closing-ritual completion (K1) records whether the formula-generated opening and closing statements are present and agree with the final numbers; it is a simple check that the mission was closed reflectively and that the reported figures were read back to the team. K1 checks the presence of an opening and a closing statement and their agreement with the numbers, not their wording. Teams may use religious formulae, as in the practice observed, secular wording or any other form they choose, and no wording scores higher than another. Contributor retention (K2) is the share of a version's contributors who also contribute in the next version. Mission chaining (K3) is the share of closed missions whose outputs seed a declared follow-on mission, such as a prototype leading to a startup, a paper or an event, which is how the companion operating-system paper describes the creative-campus project lifecycle. K3 is the indicator most directly tied to the argument that IMF is essential for building creative-campus projects, because it measures whether missions accumulate into ventures and works rather than ending at closing. Chains differ in soundness: a case study of an interlinked venture ecosystem in this series distinguishes links between working capabilities from chains of unfinished projects and grades each chain by its depth of unproven dependencies [36], and a valuation study in the same series treats such chains as staged, abandonable investments [37]. K3 records whether a mission seeds a follow-on mission, not how sound the resulting chain is.

5.8 Reporting and Aggregation Rules

Four rules govern reporting. First, indicators are reported as a profile; no composite IMF score is computed until the validation shows whether one is justified and, if so, with what weights. Second, mission-level indicators are aggregated to the unit level by median and interquartile range across missions closed in the period, because mission sizes vary and a few large missions should not dominate. Third, indicators about individuals, such as task ownership or retention, are reported only in aggregate outside the team, consistent with the privacy rule of the companion operating-system paper and with the personal-data law. Fourth, every reported figure states its period, the number of missions and the share of missions with complete data. Fifth, missing data are handled by rule, not by imputation. An indicator is computed for a mission only if all the fields its formula requires are present; otherwise it is reported as missing. Ratios over tasks, such

as evidence coverage, treat a row without the required field as not meeting the condition, because absence of evidence is what the indicator measures, but a mission without a done date has no schedule variance. Unit-level summaries report the number of missions on which each indicator was computed. Sixth, indicators derived from individual records, namely contribution spread, contributor retention and the teamwork scores, are reported outside the team only for missions with at least three contributors and only when aggregated across at least three missions, so that no individual's record can be inferred.

These rules respond to warnings that metrics can be misused [26] and that performance parameters can become a source of pressure [27]. They also reflect the dashboard literature, which uses visual summaries to make performance easy to read without distorting it [7,8], and evaluation research that combines several techniques for monitoring and improvement [38,39].

6. The IMF Maturity Model

6.1 Purpose and Structure

The IMF Maturity Model (IMF-MM) assesses how well a unit uses IMF. It is structured by the six construct dimensions of the companion concept analysis [4], mission declaration, indicator decomposition, accountable contribution, evidence-verified measurement, temporal rhythm, and meaning and recognition, and by five levels: Ad hoc, Declared, Measured, Verified and Optimising. Figure 3 shows the levels as a staircase, and Table 4 gives the criteria for each dimension at each level.

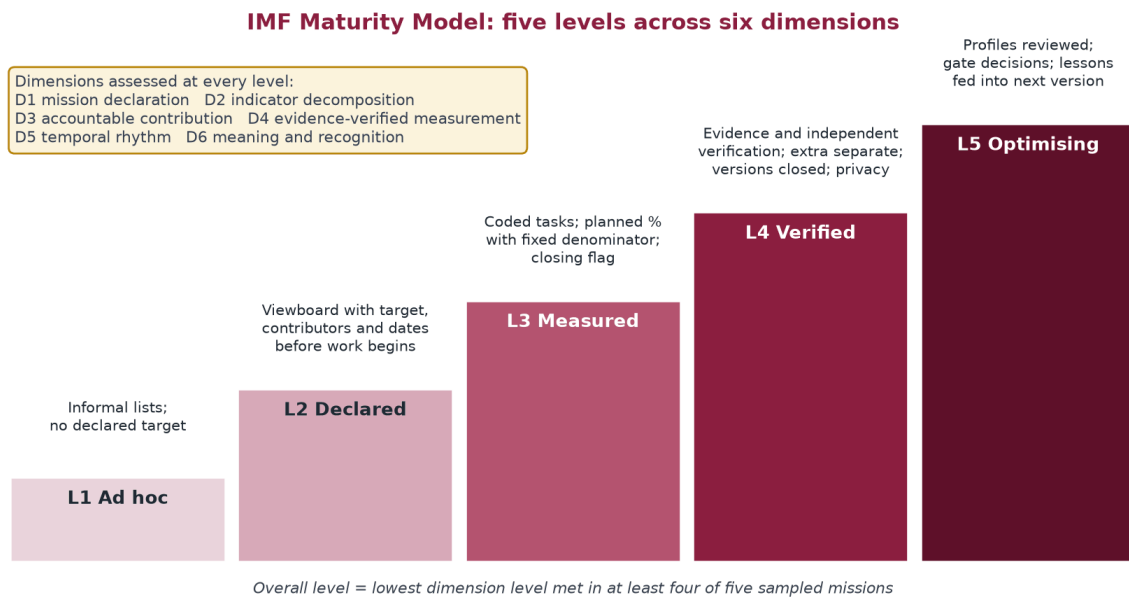


Figure 3. The IMF Maturity Model as a staircase of five levels, from Ad hoc to Optimising, each assessed across the six dimensions of IMF; the overall level is the lowest dimension level met.

Table 4. The IMF Maturity Model (IMF-MM): criteria by dimension and level

Dimension	L1 Ad hoc	L2 Declared	L3 Measured	L4 Verified	L5 Optimising
D1 Mission declaration	Work in informal lists	Viewboard with objective, target, contributors, dates before start	Target counted from coded planned tasks	Target changes logged; scoring rule declared	Objectives linked to unit and lifecycle goals
D2 Indicator decomposition	Outputs undefined	Outputs listed	Outputs coded as tasks with types	Planned and extra recorded separately	Output types aligned with recognised creative-economy outputs
D3 Accountable contribution	Ownership unclear	Contributors named	Every task has a PIC	LPIC or mentor verifies; partners have roles	Contribution spread reviewed; roles rotated
D4 Evidence-verified measurement	No measure	Status ticked	Planned achievement with fixed denominator	Evidence links and independent verification for counted tasks	Profiles audited and compared across missions
D5 Temporal rhythm	No dates	Start and due dates	Countdown and closing flag used	Versions closed on schedule	Version reviews feed next declaration
D6 Meaning and recognition	None	Informal acknowledgement	Opening and closing statements	Recognition criteria declared at opening; aggregate-only reporting	Recognition reviewed for fairness; lessons shared

Level 1, Ad hoc, describes work tracked in informal lists without declared outputs. Level 2, Declared, requires a Viewboard with objective, target, contributors and dates before work begins. Level 3, Measured, requires coded tasks, a computed planned achievement with a fixed denominator and a closing flag. Level 4, Verified, requires evidence links, independent verification, separate reporting of extra output, versioned closing and aggregate-only reporting about individuals. Level 5, Optimising, requires that unit-level profiles are reviewed each period, that gate decisions on follow-on missions use them, and that lessons are fed back into the next version.

6.2 Assessment Procedure

Maturity is assessed in three steps. First, the unit completes a self-assessment checklist derived from Table 4. Second, an assessor audits a sample of the unit’s most recent closed missions, five by default, against the criteria, using the records themselves. Third, the assessor assigns a level per dimension: the highest level whose criteria are met in at least four of the five sampled missions, with all lower levels also met. The unit’s overall level is the lowest of its six dimension levels, reported together with the full profile. Table 5 gives the evidence expected for each level.

Table 5. Evidence expected for each maturity level in the record audit

Level	Evidence expected in sampled missions	Typical gap to next level
L1 Ad hoc	Task lists, messages or files without a mission header	No declared target or due date
L2 Declared	Viewboard completed before first task date	Tasks not coded; achievement not computed
L3 Measured	Coded tasks, computed planned achievement, closing flag set	Counted tasks lack evidence; extra mixed with planned

Level	Evidence expected in sampled missions	Typical gap to next level
L4 Verified	Evidence links, verifier entries, separate extra count, closed versions, change log	Profiles not reviewed or used in decisions
L5 Optimising	Records of periodic profile review, gate decisions and changes made	Sustain and share practice

Five levels were chosen because they correspond to the distinct practice thresholds observed in IMF use: from no declaration, to declaration, to computation, to verification, to systematic use. Fewer levels would merge computation and verification, which the review showed to be the critical difference, and more levels would require distinctions that practice does not yet support. Five-level staging is also familiar from the capability-maturity tradition on which many project-management and governance models draw [11, 13]. The four-of-five rule tolerates one atypical mission without letting a unit’s best mission define its level. Where a unit has fewer than five closed missions, all of them are audited and a level is assigned only if every audited mission meets the criteria; with fewer than three closed missions, no level above Level 2 is assigned. The reported result always includes the full six-dimension profile, so a unit at Level 2 overall may show Level 4 on some dimensions.

The lowest-dimension rule is conservative by design. It reflects the observation that IMF practices depend on one another: a unit that computes achievement but does not link evidence has numbers that cannot be trusted, however well they are presented. Maturity research shows that staged models are useful precisely because they direct improvement to the next level in a defined order [11, 12], while assessments of governance and risk maturity show the value of explicit evidence for each level [13, 15].

6.3 Relation to the Indicator Set

The maturity model and the indicator set are linked but distinct. The indicators describe what missions achieved; maturity describes whether the unit’s practice makes those descriptions trustworthy and useful. Several indicators serve as evidence for maturity criteria. Evidence coverage and independent verification, for example, inform the evidence-verified measurement dimension at Level 4, and the version closing rate informs temporal rhythm at Level 3 and above. However, maturity levels are not thresholds on indicator values: a unit can be at Level 4 with modest planned achievement, because maturity concerns the integrity of practice, not the size of results. This separation prevents units from raising their maturity by inflating outputs.

7. Demonstration: An Illustrative Computation

7.1 The Invented Mission

To demonstrate the artefacts, we compute the Mission Profile for an invented mission. The mission, its team and every number below are fictional and were constructed for illustration only; they are not data and support no claim about IMF’s effects.

The invented mission is a student-led creative-campus prototype: a team of six contributors declares a target of ten outputs over a four-week version, with two external partners, a local business and a community organisation. At closing, eight planned outputs are verified, two extra outputs have been produced, and the mission closes two days before its due date. Seven of the eight counted planned outputs have working evidence links, six have been confirmed by the lead person in charge, and the target was changed once after opening. Five of the six contributors own at least one verified task. The opening and closing statements are present and agree with the numbers. Four contributors join the next version, and the prototype seeds a declared follow-on mission to prepare a startup pitch.

7.2 The Resulting Profile

Table 6 shows the resulting profile. Planned achievement is 80 percent, computed as eight verified planned outputs divided by the declared target of ten, with two extra outputs reported separately; under the variable practice described in Section 2.3, the same mission could have been reported as 100 percent by counting extras against the target. Evidence coverage is 87.5 percent and independent verification 75 percent, both computed over the eight counted outputs. Declaration stability is 0.9. Contribution spread is about 83 percent. Teamwork indicators are left blank, because they require questionnaire responses, which an invented mission cannot provide.

Table 6. Illustrative Mission Profile for an invented mission (fictional numbers, not data)

Code	Indicator	Inputs (invented)	Value
A1	Planned achievement	8 verified planned / target 10	80%
A2	Extra output	2 verified extra outputs	2
A3	Output yield	1 tested prototype, 1 showcase event (others: task outputs)	Prototype 1; event 1
T1	On-time closing	Closed 2 days before due	1
T2	Schedule variance	Due minus done	+2 days
E1	Evidence coverage	7 of 8 counted outputs linked	87.5%
E2	Independent verification	6 of 8 confirmed by LPIC	75%
E3	Declaration stability	1 change / target 10	0.9
C1	Ownership coverage	All rows owned	100%
C2	Contribution spread	5 of 6 contributors own a verified task	83%
C3	Partner engagement	Business and community	2 of 6
P1-P5	Teamwork perceptions	Require questionnaire responses	Not computed
K1	Closing-ritual completion	Statements present and consistent	1
K2	Contributor retention	4 of 6 continue	67%
K3	Mission chaining	Follow-on pitch mission declared	Seeded (unit-level input)

7.3 What the Demonstration Shows

The demonstration shows three things about the design, none of them evidence of validity. First, the indicators can be computed by hand from the kind of records IMF already keeps, which supports the parsimony objective. Second, the two-number rule changes the headline figure in an ordinary case, which is why fixing the denominator matters. Third, the profile reveals weaknesses that a single percentage hides: in the invented case, one counted output lacks evidence and two lack independent verification, which a mentor could act on before the next version. Whether the indicators are relevant, clear, reliable and useful in real missions is the question of the validation protocol.

8. Validation Protocol

8.1 Overview

The indicator set and maturity model are design proposals. Before they are used for any decision about missions, people or units, they must be shown to be relevant, clear, reliable and feasible. We therefore pre-specify a three-phase validation protocol: a modified Delphi study to reach expert consensus on the indicators, items and maturity criteria; content-validity indexing to quantify the experts' judgements of relevance; and a pilot in real creative-campus missions to examine

reliability, feasibility, sensitivity and known-groups validity. Figure 4 shows the planned sequence and timeline, including the cognitive interviews on the teamwork items that precede the pilot. The decision criteria in this section are fixed in advance so that the results, when reported, can be judged against them rather than interpreted after the fact.

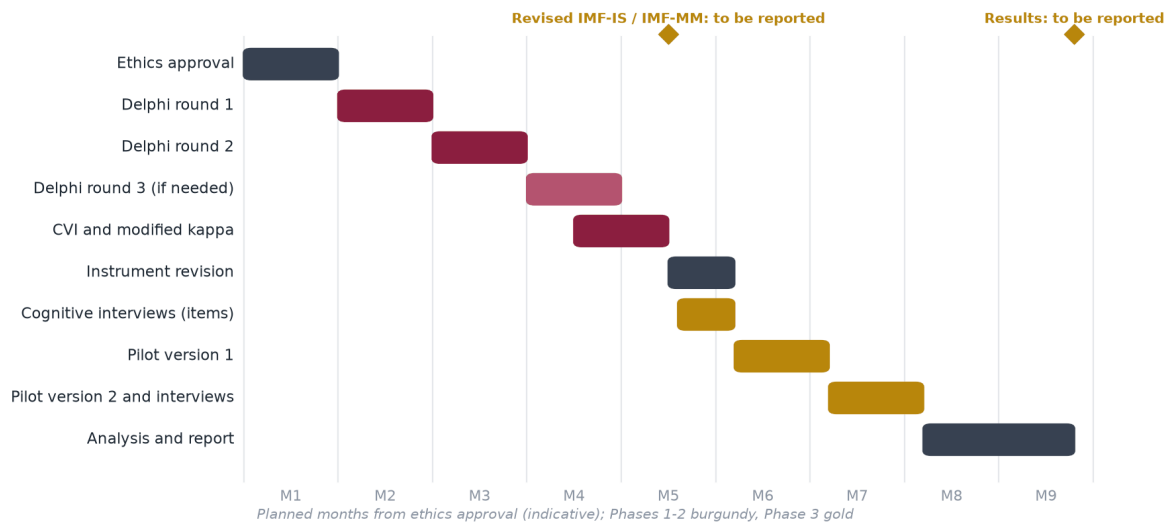


Figure 4. Planned validation timeline in months from ethics approval: modified Delphi rounds, content-validity indexing, instrument revision, cognitive interviews on the teamwork items, a two-version pilot and analysis. All results are to be reported; the timeline is indicative.

Staged validation of this kind is common in the evaluation of new campus artefacts. Incubator models have been judged for practicality and effectiveness by experts and tenants before wider use [24], textbooks have been tested for feasibility and effectiveness after expert validation [23], and information systems have been evaluated with standard usability instruments before and after redesign [18]. Studies that measure new constructs across contexts show why the meaning of items must be checked with the people who will use them [25, 40].

8.2 Phase 1: Modified Delphi Study

The Delphi study will gather structured, anonymous expert judgement in iterative rounds. The panel will comprise twelve to fifteen experts in four groups: experienced IMF practitioners who have led missions as lead persons in charge or mentors; project-management and quality-assurance specialists; managers of campus incubators and creative-economy programmes; and specialists in educational measurement. The planned size gives at least three experts per group and stays within the range commonly used for content validation. Experts will be invited purposively, and no expert will be one of the authors.

Round 1 will present the measurement definition, the twenty indicators, the fifteen teamwork items and the maturity criteria. Experts will rate each element for relevance and clarity on four-point scales and may propose edits, deletions and additions in open comments. Round 2 will present the revised elements together with the anonymised distribution of Round 1 ratings and a summary of comments, and experts will re-rate. A third round will be held only for elements that have not reached consensus or stability. Consensus is defined in advance as at least 75 percent of experts rating an element 3 or 4 on relevance, with an interquartile range of 1 or less; stability is defined as a change of less than 15 percentage points in the share of experts rating 3 or 4 between rounds. Elements that reach neither consensus nor stability after three rounds will be dropped or flagged as provisional.

The Delphi study will also ask experts to judge two design choices on which the review found no settled answer: whether a composite IMF score should ever be computed, and whether the

lowest-dimension rule for overall maturity is appropriate. Their judgements will be reported, but the choices will be retained or changed only if the consensus criterion is met. In the final round, experts will also evaluate the maturity model as a whole against four model-level criteria: completeness, whether the dimensions and levels cover the practices that matter; mutual exclusivity, whether adjacent levels are clearly distinguishable; understandability, whether unit managers could apply the criteria without help; and usefulness, whether the model would guide improvement. Each criterion will be rated on a four-point scale with the same consensus rule, and assessors in the pilot will rate understandability and ease of use again after applying the model.

8.3 Phase 2: Content-Validity Indexing

Content validity will be quantified from the final Delphi relevance ratings. The item-level content-validity index (I-CVI) is the share of experts rating an element 3 or 4. The scale-level index by averaging (S-CVI/Ave) is the mean of the I-CVIs within a domain or within the maturity grid, and the universal-agreement index (S-CVI/UA) is the share of elements rated 3 or 4 by all experts. Because I-CVI does not account for chance agreement, a modified kappa will also be computed for each element by adjusting the I-CVI for the probability of chance agreement given the panel size. With N experts of whom A rate an element relevant, the probability of chance agreement is $P_c = [N! / (A! (N - A)!)] \times 0.5^N$, and the modified kappa is $k^* = (I-CVI - P_c) / (1 - P_c)$. The two criteria have different roles: the Delphi consensus criterion decides whether an element needs another round, and the final-round I-CVI, together with the modified kappa, decides whether it is retained. For a panel of twelve, an I-CVI of at least 0.78 means that at least ten experts rate the element relevant (0.83); for a panel of fifteen it means at least twelve (0.80).

The planned criteria follow conventions in the measurement literature: Lynn's recommendation that, with six or more experts, an I-CVI of at least 0.78 indicates acceptable relevance, and the guidance of Polit, Beck and Owen that an S-CVI/Ave of at least 0.90 indicates excellent content validity and a modified kappa above 0.74 excellent agreement. Elements below the I-CVI criterion will be revised and re-rated once or removed. Table 7 summarises the Delphi and content-validity criteria and their status; all results are to be reported.

Table 7. Planned Delphi and content-validity criteria (results to be reported)

Criterion	Definition	Planned threshold	Result
Consensus	Share of experts rating relevance 3 or 4, with IQR	$\geq 75\%$ and IQR ≤ 1	To be reported
Stability	Change in share rating 3 or 4 between rounds	< 15 percentage points	To be reported
I-CVI	Share of experts rating an element 3 or 4	≥ 0.78 (six or more experts)	To be reported
S-CVI/Ave	Mean I-CVI within a domain or the maturity grid	≥ 0.90	To be reported
S-CVI/UA	Share of elements rated 3 or 4 by all experts	Reported descriptively	To be reported
Modified kappa	I-CVI adjusted for chance agreement ($k^* = (I-CVI - P_c) / (1 - P_c)$)	> 0.74	To be reported
Model-level evaluation	Completeness, mutual exclusivity, understandability, usefulness of the maturity model	Consensus rule as above	To be reported
Clarity	Share of experts rating clarity 3 or 4	$\geq 75\%$; otherwise reword	To be reported

8.4 Phase 3: Pilot in Creative-Campus Missions

The pilot will apply the revised instrument to eight to twelve creative-campus missions in at least three units, followed over two consecutive versions. Missions will be selected to vary in type,

including prototype, publication and event missions, and in the maturity of the unit running them. The aim is not statistical generalisation, which the sample cannot support, but evidence on whether the instrument works as designed. Table 8 lists the pilot objectives, measures, analyses and decision criteria.

Table 8. Pilot objectives, measures, analyses and planned decision criteria (results to be reported)

Objective	Measure	Analysis	Planned criterion	Result
Record-indicator reliability	Two raters compute all record-based indicators	ICC (continuous); Cohen's kappa (binary)	ICC ≥ 0.90 ; kappa ≥ 0.80	To be reported
Maturity reliability	Two assessors rate each unit per dimension	Weighted kappa	≥ 0.60	To be reported
Teamwork scale consistency	Fifteen items at closing	Alpha and omega per three-item scale; inter-item correlations	Interpreted cautiously	To be reported
Feasibility	Time to compute profile; time to answer; completion	Medians and ranges	≤ 10 min; ≤ 5 min; $\geq 80\%$	To be reported
Usefulness	Structured interviews after version 2	Thematic summary	Actions attributed to profile	To be reported
Sensitivity	Indicators across two versions	Descriptive change	Change where expected	To be reported
Known groups	E1 and E2 by maturity level	Descriptive comparison	Higher in higher-maturity units	To be reported

Reliability of the record-based indicators will be examined by having two trained raters independently compute every indicator for every pilot mission from the same records. Agreement will be estimated with a two-way intraclass correlation coefficient for continuous indicators and Cohen's kappa for binary ones; the planned criteria are 0.90 and 0.80 respectively, because the indicators are defined by formula and disagreement should arise only from ambiguous records or definitions. Every disagreement will be logged and classified as a rater error, a record ambiguity or a definitional gap, and definitional gaps will lead to revised formulas.

Reliability of the maturity assessment will be examined by having two assessors independently rate each pilot unit on each dimension; agreement will be estimated with weighted kappa, with a planned criterion of 0.60. Internal consistency of the teamwork scales will be explored with Cronbach's alpha and McDonald's omega for each three-item scale, interpreted cautiously given the small sample; inter-item correlations will be inspected to identify items that do not fit their scale.

Feasibility will be measured by the time taken to compute the Mission Profile, with a planned criterion of no more than ten minutes per mission once the sheet additions are in place; by the time taken to complete the questionnaire, with a criterion of no more than five minutes; and by the questionnaire completion rate, with a criterion of at least 80 percent of team members. Usefulness will be explored through short structured interviews with lead persons in charge and mentors after the second version, asking what they changed because of the profile.

Sensitivity will be examined by comparing each mission's indicators across the two versions, to see whether the indicators register change where change is expected. Known-groups validity will be explored by comparing evidence-integrity indicators between units assessed at higher and lower maturity levels; we expect higher-maturity units to show higher evidence coverage and independent verification. With so few units, this comparison is descriptive, not a significance test.

The expected direction is fixed here, before any data are collected, and a result in the opposite direction will be reported as such.

8.5 Results to Be Reported

No validation results are reported in this paper. Table 9 lists the results that will be reported after the validation, with their planned form. Every entry is to be reported. We do not anticipate the direction of any result beyond the expectations stated in Section 8.4, and the report will include indicators and items that fail their criteria, together with the revisions made.

Table 9. Results to be reported after validation

Result	Planned form	Status
Panel composition and response rates per round	Counts by expert group (no identities)	To be reported
Elements retained, revised, added or dropped	Lists with reasons	To be reported
I-CVI, S-CVI/Ave, S-CVI/UA and modified kappa	Tables by domain and dimension	To be reported
Expert judgement on composite score and lowest-dimension rule	Consensus statistics and comments	To be reported
Inter-rater agreement for indicators and maturity levels	ICC and kappa with confidence intervals	To be reported
Teamwork scale statistics	Item means, alpha, omega; cognitive-interview revisions	To be reported
Feasibility and usefulness	Times, completion rates, interview themes	To be reported
Sensitivity and known-groups patterns	Descriptive tables and figures	To be reported
Revised IMF-IS and IMF-MM	Final indicator table and maturity grid	To be reported

8.6 Ethics and Data Management

The validation will begin only after approval by an institutional ethics committee. All participants will give informed consent and may withdraw at any time. Delphi responses will be collected anonymously and reported in aggregate. Pilot data will be extracted from IMF sheets by the research team without personal identifiers: contributors will be replaced by codes before analysis, evidence links will be checked for presence and function but their contents will not be copied, and no individual-level indicator will be reported outside the team concerned. Questionnaire responses will be anonymous, and the minimum-group rules of Section 5.8 apply to every report. Data handling will follow Law No. 27 of 2022 on Personal Data Protection, and the de-identified analysis data set will be made available on reasonable request when the results are reported, subject to the participants' consent.

9. Discussion

9.1 Why Measurement Makes IMF Essential for Creative-Campus Projects

The brief for this series asks why IMF is an essential tool for building creative-campus projects. The measurement perspective gives a specific answer: because creative-campus projects need to show what they produce, and IMF already holds most of the records required to show it. A prototype, a startup pitch, a paper or an event is easy to announce and hard to account for. The indicator set turns the IMF sheet into an account: of what was declared and achieved, when, with what evidence, by whom and with which partners, and of whether the work led somewhere.

That account matters at three levels. For teams, the Mission Profile shows weaknesses early, such as unverified outputs or achievement resting on a few contributors, while there is still

time to act. For units, the maturity model gives a staged path from informal lists to verified, versioned practice, which is the kind of directed improvement that maturity assessments aim to support [11, 16]. For the university and its partners, aggregated profiles can supply the creative-economy data that national policy now asks for. Presidential Regulation No. 37 of 2026 on the Creative Economy Master Plan 2026 to 2045 includes creative-economy data, talent, intellectual property and hexa-helix synergy among its programmes, and output-yield and partner-engagement indicators map onto those priorities. The World Conference on Creative Economy, to be held in Jakarta on 21 to 23 October 2026 under the theme “Inclusively Creative: Collective Continuity”, gives that agenda international visibility; the continuity domain, with its retention and chaining indicators, is one way of measuring collective continuity at campus scale. An earlier paper in this series proposed an Inclusive Creative Campus framework of access, capability, care and continuity, with an indicator set and a feedback path from graduates’ outcomes to access, as an institutional reading of the same theme [41]; the continuity indicators proposed here work at the smaller scale of the single mission and its follow-ons.

Measurement also supports the incubation and learning-factory models through which campuses build ventures. Studies of incubator success and of new incubator models stress the need to evaluate whether incubation works [24, 32], and learning-factory research measures student performance and learning outcomes from production and activity data [33, 38]. Pitching research shows how carefully ventures must communicate value to investors [42]; a verified record of outputs and milestones is part of that value. IMF missions with a fixed definition of achievement and an evidence trail can feed all of these.

9.2 Relation to the Companion Papers

This paper complements the two companion papers in the series. The concept analysis [4] proposed the six dimensions of IMF and a measurement convention that separates planned and extra outputs; here those dimensions structure the maturity model and the convention becomes indicator A1. The operating-system paper specified the layers, rules and lifecycle through which IMF runs creative-campus projects; here its declaration, evidence, two-number, closing and privacy rules become measurable criteria, and its mission-chaining idea becomes indicator K3. The three papers can be read as definition, operation and measurement of the same method.

The name Viewboard is used in other campus work for information media on institutional websites [43]; in IMF it refers specifically to the mission header, and the indicator set draws on that header’s fields. Keeping the terms distinct avoids confusing a display with an instrument.

9.3 Risks of Measuring IMF

Measuring IMF could harm the practice it seeks to strengthen. When an indicator becomes a target, people may optimise the indicator instead of the work: lowering declared targets, splitting tasks to raise counts or linking token evidence. The design includes three safeguards. Declaration stability penalises target reductions after opening. Planned achievement and extra output are reported separately, so that padding the extra section does not raise the headline figure. And maturity levels depend on the integrity of practice, not on the size of results. Even so, no design can prevent gaming entirely, and the pilot interviews are intended to reveal unintended behaviour. Burden is a related risk: every column added to a busy student team’s sheet competes with the work itself. The design therefore assigns additions to existing roles, limits them to three fields and makes feasibility a pilot criterion, so that an indicator that costs more than it informs can be dropped.

A second risk is pressure on contributors. Research on faculty stress shows how performance parameters can grow into overhead pressure that harms teaching and learning [27], and evaluations of research-impact tools note the malpractice that metrics can encourage [26]. The reporting rules, especially aggregate-only reporting of individual indicators outside the team, aim to keep IMF

measurement developmental. This is consistent with humanistic approaches to campus technology, which seek to balance digital advancement with well-being [28, 29].

A third risk is false precision. Fuzzy and hybrid evaluation models have been proposed precisely because many performance judgements are imprecise [44], and digital-maturity research warns that maturity differs with infrastructure, skills and leadership [17]. The instrument therefore reports profiles with stated coverage instead of a single score, and maturity levels with evidence instead of decimals.

9.4 Limitations

The study has four limitations. First, the artefacts are designed but not yet validated; the demonstration uses an invented mission and is not evidence of validity, reliability or usefulness. Second, the design draws on the structure of spreadsheets from one institution, and IMF practice elsewhere may differ. Third, the teamwork items are drafts that reinterpret a list from the founding paper, and three items per quality is the minimum for a reflective scale; their meaning may shift in expert review, and the five qualities may not form distinct factors. Fourth, the pilot sample is small and purposive, so its results will indicate whether the instrument works as designed, not how IMF performs in general. Effects of IMF on outcomes, which the founding paper claims, remain untested and would require comparative designs beyond this protocol.

9.5 Future Work

After validation, three lines of work follow. First, a revised instrument, with formulas built into an IMF template so that the Mission Profile is computed automatically, would reduce the burden of measurement; campus monitoring platforms show how such tracking can be built into everyday systems [2, 3]. Second, longitudinal use across many missions would allow tests of whether maturity predicts achievement, timeliness and chaining, and whether the teamwork qualities change with practice. Third, comparative studies, using units that adopt IMF at different times, would begin to test the effects claimed for the method. Structural modelling approaches used in campus research on performance and publication management could support such analyses once data accumulate [20, 22].

10. Conclusion

IMF has been used to run campus projects since 2019, and its name promises measurement, but the method itself has not been measured. The founding texts claim effects without reporting an instrument, the citing literature does not engage with the method, and the achievement percentage computed in practice varies in definition. This paper has reframed IMF as a measurement instrument and, following design science research, has designed two artefacts and the protocol for validating them.

The new measurement definition presents IMF as a structured set of indicators, computed mainly from Viewboard and Content records and supplemented by short team ratings, that quantifies how fully, promptly, verifiably and collaboratively a declared mission achieved its outputs and places the unit on a five-level maturity scale. The IMF Indicator Set operationalises this definition in twenty indicators across achievement, timeliness, evidence integrity, ownership and collaboration, teamwork perceptions and continuity, with one formula per indicator and a fixed denominator for planned achievement. The IMF Maturity Model assesses six dimensions on five levels, from ad hoc to optimising, using a conservative lowest-dimension rule. An invented example showed how the indicators are computed and how the fixed denominator changes the headline figure.

The validation protocol specifies a modified Delphi study, content-validity indexing with model-level evaluation, cognitive interviews on the teamwork items and a pilot in creative-campus

missions, with decision criteria fixed in advance. Every result is to be reported. If the instrument passes its criteria, IMF will offer creative-campus projects what they most need from a management routine: a trustworthy account of what they set out to do, what they achieved and where it led.

Appendix A. Traceability of the Design

Table 10 links each indicator domain and maturity dimension to its sources and to the design objectives of Section 3.2, and labels its status.

Table 10. Traceability of the indicator domains and maturity dimensions to sources and objectives

Element	Main sources	Objectives	Status
A Achievement	Blog 2019; paper 2020; Capaian formulas in sheets; two-number rule of companion paper	O1, O2, O4	Documented and observed; fixed denominator adopted
T Timeliness	Due date (paper 2020); countdown, done date, closing flag in sheets	O2, O3, O5	Observed; T3 newly proposed
E Evidence integrity	Evidence links in sheets; evidence rule of companion paper	O1, O2, O6	E1 observed; E2 and E3 newly proposed
C Ownership and collaboration	Contributors (blog, paper); PIC and LPIC in sheets; hexa-helix policy	O1, O5, O6	C1 observed; C2 and C3 newly proposed
P Teamwork (5C)	List of five qualities in paper 2020	O1, O3, O6	Newly operationalised
K Continuity	Opening and closing statements and versions in sheets; mission chaining of companion paper	O4, O5	K1 observed; K2 and K3 newly proposed
D1-D6 maturity dimensions	Construct dimensions of companion concept analysis	O1, O5	Adopted
Five levels and assessment rule	Staged maturity literature; observed practice thresholds	O4, O5	Newly proposed

Appendix B. Glossary of IMF Terms

Table 11 explains the Indonesian and IMF-specific terms used in this paper.

Table 11. Glossary of Indonesian and IMF-specific terms

Term	Literal meaning	Function in IMF
Tujuan	Objective	Mission objective on the Viewboard
Luaran (Target, Extra, Total)	Output	Declared planned outputs, additional outputs and their sum
Capaian	Achievement	Achievement percentage; defined in this paper as planned achievement (A1)
Viewboard	(English term)	Mission header with objective, outputs, contributors, dates and flags
Content	(English term)	Grid of coded task rows
Lovecode	(IMF term)	Unique code of a task row
PIC / LPIC	Person in charge / lead person in charge	Task owner / owner of a group of tasks
Disini	Here	Label of the evidence link in the notes cell
CLOSING / NOT CLOSING	(English terms)	Flag showing whether the mission has a done date

Declarations

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Data availability. No new data were collected or analysed for this paper. The paper presents an instrument design and a validation plan; the invented example in Section 7 is fictional. Data from the planned validation will be described when the results are reported.

Ethics. No human participants were involved in the work reported here. The validation protocol will be submitted for institutional ethics approval before any data collection.

Use of AI tools. AI-based tools were used to assist with literature screening, drafting, editing, figure preparation and formatting. The authors reviewed and verified all content, including every reference, and take full responsibility for the manuscript.

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