

## ICLHE Task Design: Case of L1 Computer Science, Tlemcen University Conception de Tâches à Contenu Intégré: Cas des L1 Informatique, Université de Tlemcen

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#### Abstract

This paper focuses on the importance of Integrated Content and Language (ICL) assessment in higher education (HE) and its impact on learners' competencies. It emphasizes the significance of deploying a Learning-oriented Assessment (LOA) approach for assessment design in English for Specific Purposes. It highlights the role of assessment as an embedded component of the teaching and learning processes, providing insights into the learners' progress, achievements, and needs. This work outlines the design of an integrated-skills achievement test within computer science, incorporating the LOA framework and the Meaning Oriented Model of L2 proficiency to enhance the assessment process and support students in acquiring both linguistic and non-linguistic skills in requirements elicitation. It advocates for assessment procedures that promote learners' motivation, self-esteem, and prioritization of personal growth. The work aims at providing English language and subject-matter instructors with a template for designing integrated-skills, learning-oriented ICL assessments, considering the need for content and language integration in the Algerian higher education context.

Keywords: Computer science, ICLHE, LOA, MOM, requirements elicitation

### Résumé

Cet article met l'accent sur l'importance de l'évaluation intégrée du contenu et de la langue (ICL) dans l'enseignement supérieur (ES) et son impact sur les compétences des apprenants. Il souligne l'importance de déployer une approche d'évaluation axée sur l'apprentissage (LOA) pour la conception des évaluations en anglais sur objectifs spécifiques. Il met en évidence le rôle de l'évaluation en tant que composante intégrée des processus d'enseignement et d'apprentissage, fournissant des informations sur les progrès, les réalisations et les besoins des apprenants. Ce travail décrit la conception d'un test de compétences intégrées dans le domaine de l'informatique, intégrant le cadre LOA et le modèle orienté vers le sens (MOM) de maîtrise de la L2 afin d'améliorer le processus d'évaluation et d'aider les étudiants à acquérir à la fois des compétences linguistiques et non-linguistiques dans l'élicitation des exigences. Il préconise des procédures d'évaluation qui favorisent la motivation, l'estime de soi et la priorisation de la croissance personnelle des apprenants. Ce travail vise à fournir aux enseignants d'anglais et de matières spécifiques un modèle de conception d'évaluations ICL axées sur l'apprentissage et les compétences intégrées, en tenant compte de la nécessité d'intégration du contenu et de la langue dans le contexte de l'enseignement supérieur en Algérie.

Mots-clés: Informatique, ES, ICL, LOA, MOM, élicitation des exigences

## Introduction

Assessments are an integral part of the teaching and learning processes. They are vital in gaining insights into the teaching and learning experiences and can occur before, during, or after instruction. These assessments, which are aligned with the curriculum, can take various forms such as progress, achievement, and placement tests, as well as unplanned assessments within the classroom (Carr, 2011). Assessment encompasses a range of processes and techniques used to gather, measure, and analyze data related to learners' abilities, achievements, needs, and challenges.

Traditional assessments have faced criticism for being decontextualized, lacking authenticity, and having negative effects (Boubris & Haddam, 2020). One common drawback of traditional assessments is that students tend to focus solely on test formats and scores due to their perceived significance. Embedding instruction within anICL learning-oriented assessment can serve as an assessment of, for, and as learning. This approach has the potential to shift learners' priorities from scores to personal development, fostering motivation and self-esteem (Turner & Purpura, 2016). Reevaluating assessment procedures can bring about substantial positive changes. Therefore, it is crucial for the entire educational system to work towards promoting contemporary assessment theories and implementing best practices.

Integrated Content and Language (ICL) assessments in higher education center on the necessary competencies that learners need to match the demands of academia, workplaces, and society. The utilization of these competencies in the internationalization process requires proficiency in using contextual, topical, socio-cognitive, and linguistic resources within the domain-specific situations. ICL focuses assessments put emphasis on learners' linguistic and non-linguistic needs. Given the increasing importance of integrating content and language in the Algerian context, the primary objective of this study is to provide English language instructors and subject-matter instructors with a template for designing integrated-skills, learning-oriented, ICL assessments in higher education.

### Literature review

Research in the field of ESP and ICL has mainly focused on the didactic processes, including, the teaching methods, materials, and assessment. The Learning-oriented Assessment (LOA) approach (Turner & Purpura, 2016) provides ICL practitioners with a genuine framework to modulate the set of factors that moderate or indicate learners' performance. It shifts focus from the commonly known assessment of learning and assessment for learning, to a whole new perspective that puts emphasis on assessment as an agent at the service of learning. Two of the eight dimensions included in the LOA framework indicate learners' performance by specifying the targeted linguistic and disciplinary proficiency (knowledge, skills, and abilities), in addition to specifying the elicitation procedures deployed to record the performance. This framework can also be used to design instruction so both are aligned.

The six remaining dimensions are considered as performance moderators, in the sense that they have the capacity to directly impact learners' performance. These include the context, in which the most important aspects of the assessment are specified, such as: the audience, the settings, and the topic, in addition to the communicative event, the target language use-domain, the enabling skills, and the culminating competency, among others. Social-cognition is another performance moderator that takes into consideration the mental processes, the cognitive load, and the distributed cognition needed in the co-construction of knowledge. The framework also considers the affective dispositions of learners in relation to the context and the assessment itself. These may include positive and negative psychological, behavioral, and social dispositions.

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The instructional dimension considers how learners receive and process feedback and assistance to reassess their knowledge and better their performance (involving the transfer of new information such as feedback or assistance and how this information is delivered). This dimension is at the core of learning-oriented by design assessments. It involves input, assistance, and feedback as instruction, in addition to explicit instructional episodes if necessary, the purpose being to promote learning. The social-interactional dimension considers the sequential organization and exchange patterns of assessments or instruction that involve interaction. Finally, the technological dimension takes into consideration users' characteristics, if the assessment or instruction involves the use of technology, and learners' computer skills and digital literacy.

The Meaning Oriented Model (MOM) (Purpura & Dakin, 2020) can be used to determine the specifications for the proficiency dimension, informing the curriculum, the instruction, and assessment. The ability to successfully encode and decode meanings through the systematic use of language is necessary to demonstrate real-world competencies. The MOM emphasizes the importance of using linguistic resources to convey both literal and implied propositional meanings in real-world communication. The model considers S/ FL proficiency as involving semanticogrammatical knowledge (the understanding of the literal meaning of linguistic forms) and pragmatic knowledge (the ability to use language to express and interpret functional and implicational meanings). The MOM of L2 proficiency can inform curriculum design, instruction, and assessment, as it takes into account the essential role of language in the co-construction of meanings in real-life situations.

Test development can be construct-based, in the sense that it allows for the use of the MOM of L2 proficiency in the development of performance scoring methods (the use of theoretical definitions of language knowledge to drive assessment). It can also assume a task-centered approach through the integration of tasks and skills. Tasks could include, but are not limited to, selected-response, limited productions, and extended productions (Carr, 2011). However, evaluators have to pay attention to the standards and issues related to the use of any given measurement instrument.

ICL assessment focuses on the means by which we measure learners' knowledge, skills, and abilities that translate into a culminating, real world competency related to some discipline. Assessment can be learning-oriented by design. The application of the LOA framework to assessment engineering establishes a link between ICL use events, ICL instruction, and ICL assessment. It situates the context in which the elicitation of the specified ICL performance will take place. It also accounts for the other factors moderating this performance, such as the feedback and assistance. The design of learning-oriented complex tasks involves the consideration of each of the LOA dimensions. The enabling tasks and the culminating task can be engineered to provide examinees with new information or correct previous information, through assistance and feedback.

#### **Designing and Integrated-skills ICL Achievement Test**

Requirements engineering is the first step, and arguably the most important stage in software development cycle.Computer Science L1 students still find difficulties in formulatingtargeted questions to evaluate simple user requirements, even if they are supposed to possess the necessary knowledge and skills to do so. The causes can be related to traditional evaluative approaches that tend to focus on the evaluation of learning. The LOA framework has proved to be an effective approach to assessment that fosters learning and skills development (linguistic and non-linguistic). This section describes the designing of an ICL integrated-skills achievement test within computer science, based on the LOA framework and the MOM of L2 proficiency.

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To bridge the gap between theory and practice then successfully design the activity, a joint effort of subject matter instructors and English language instructors was required. The contextual dimension was first determined, since it informs the majority of the other dimensions. The activity was designed for first year Computer Science undergraduate students, Tlemcen University, in an ESP class. The activity fostered on the requirements elicitation, as a key constituent of software development.

The target language use domain was identified as professional as learners were asked to write a meaningful, coherent, correct, and targeted series of questions (an interview) to elicit the needs of an end-user (a client). A form-function analysis has helped in the identification of the envisioned linguistic resources so that assistance and scoring rubrics could be designed accordingly. The activity was engineered in order to take into consideration both performance moderators and indicators, based on the LOA framework, from teachers' and learners' perspectives.

The test includes four tasks. It is an integrated-skills activity that takes into consideration the importance of socio-cognition and social-interaction in co-construction of knowledge. The culminating task is reached after enabling students through different types of input and assistance. The elicitation dimension involves a scored extended-production task during which learners are supposed to use the assistance to evaluate previously activated topical and linguistic resources then use these to write their requirements interview questions.

The proficiency dimension focuses on student's ability to form questions using interrogative pronouns and making requests using auxiliaries (morphosyntactic forms).Student's ability to negotiate and interpret meanings related to the end-user's needs is at the core of the proficiency dimension. Using greetings and expressing gratitude is also important to start and conclude the interview (interactional forms).Moreover, specialized vocabulary is crucial to accurately convey propositional and functional meanings in the written form. Proficiency also involves formality and politeness. To show topical control and accuracy, the client's needs have to be inferred from the input provided in the last task.

The test does not include any social-interactional aspect, however,human-computer interaction, can be considered as it may impact test taker's experience. The technological dimension of the activity, involving online settings, requires basic computer literacy. The test provides the learners with mainly four types of assistance: input as instruction (text and interview sample), assistance as instructional (algorithm), embedded explicit instruction (operational definitions and terminology), and feedback as instruction (pre-programmed key answers).

The socio-cognitive dimension of the test relies on higher-order thinking processes, since learners need to analyze the interview sample, the algorithm, in addition to the sample answers provided to evaluate topical and linguistic resources then create propositional and functional meanings. The culminating task requires much more reasoning and focus than the enabling tasks. Finally, the psychological dispositionsmay vary from confidence and motivation toconfusion and disengagement depending on learners' language proficiency and their psychological preparation to engage in the task. Some behavioral dispositions to be expected are persistence and tolerance for ambiguity. However, social dispositions are not to be expected.

Performance moderators						
Proficiency dimension	SL/FL KSAs:					
	To use interrogative pronouns, auxiliaries (make requests), simple tenses, and topical content to accurately form questions.					
	To use interactional forms to increase coherence and politeness					
	Direct functional meanings include direct questions with targeted needs.					
	Implied functional meanings include inferences based on client's answers.					
	Topical KSAs:					
	To develop and display a full understanding of the conce of user's needs.					
	To understand the purpose of a given algorithm.					
	To read an algorithm.					
	To inquire about general and specific user's needs.					
Elicitation dimension	Task: extended production					
	Scoring:scored					
	Timed:90 minutes					
	TLU:professional					
	Input:text / interview / algorithm					
	Instruction (culminating task):					
	Complete the dialogue between the developer and the client, focusing on asking relevant questions and activel listening to the client's responses.					
	<b>Prompt</b> : assume the role of the developer.					
	<b>Expected response:</b> based on the given input students are expected to writemeaningful, coherent, correct, and targeted series of questions (an interview) to evaluate the needs of an end-user (a client) based on his feedback.					
	<b>Process:</b> students use the assistance to evaluate previously activated topical and linguistic resources then form questions.					
Performance indicators						
Contextual dimension	Disciplinary domain / Course: Computer science / Technical English1					
	<b>Topic / Theme:</b> Software development / Requirements elicitation					

 Table 1: LOA dimensions of the achievement test

	Audience / Institution: first year undergraduate stud in a ESP class, Tlemcen University					
	Language use domain: Professional					
	Setting:online					
	Purpose: curriculum-based achievement test.					
	<b>Enabling skills:</b> to activate learners' schemata and reinforce topical and linguistic understandings through assistance					
	<b>Envisioned language resources:</b> lexical, morphosyntactic, and interactional forms in addition to disciplinary resources					
	<b>Culminating competency:</b> the ability to ask relevant questions and actively listen to the client's responses.					
Instructional dimension	Input: text and interview sample					
	Assistance as instructional: algorithm.					
	Embedded explicit instruction: operational definitions					
	Feedback: pre-programmed key answers					
Affective dimension	<b>Positive psychological dispositions:</b> confidence and motivation					
	<b>Negative Positive psychological dispositions:</b> boredom and disengagement					
	<b>Positive behavioral dispositions:</b> persistence, effort and tolerance for ambiguity					
	Negative behavioral dispositions: lack of initiative					
	Social dispositions: NA					
Social-cognition dimension	Higher-order thinking processes: analysis, application, and creation					
	Involves STM and LTM, information processing, and reasoning.					
Technological dimension	Basic computer literacy.					
	Requires an email and internet connection					
Social-interactional dimension	Human-computer interaction.					

The test is considered as objective because it includes MCQs to test semantico-grammatical and topical knowledge, in addition to reading comprehension. The culminating task is an extended production task, with a planned scoring rubric to limit the subjectivity of the rater. The test is considered to be high-stakes to a certain degree because it is scored and will serve as a basis for future decisions about learners' achievements. It is criterion-referenced, performance oriented, including direct and indirect tasks, capable of providing both summative and formative information. The task design process involved both a construct-based (the MOM) and a taskcentered (complex, integrated) approach. The table below shows specifications about the achievement test.

Test component	Task types	Time	Length	Scoring			
Reading ability (enabling task)							
-Theme: requirements elicitation -Proficiency: negotiating meaning from a text	-Input: adapted text -Task type: MCQ -Task title: maximizing client's Engagement	-Input: 10 mins - Items: 10 mins	5 items: propositional and functional meanings	Right/Wrong Scoring 0/1 5 pts.			
S-G Knowledge (enabling task)							
<ul> <li>Theme: requirements elicitation</li> <li>Proficiency:</li> <li>Morphosyntactic forms: simple tenses, auxiliaries, interrogative pronouns</li> <li>Interactional forms: greeting, expressing gratitude.</li> </ul>	<ul> <li>Input: requirements elicitation interview transcript</li> <li>Task type: MCQ</li> <li>Task title: asking meaningful questions</li> </ul>	15 mins	10 items	Right/Wrong Scoring 0/1 10 pts.			
Topical knowledge through Reading (enabling task)							
-Theme: requirements elicitation -Proficiency: negotiating meaning from an algorithm	-Input: discount scheme algorithm -Task type: MCQ	-Input: 7 mins -Task: 8 mins	4 items	Right/Wrong Scoring 0/1 4 pts.			

# Table 2: Achievement test blueprint

	-Task title: coding client's needs							
ICL writing ability (culminating task)								
<ul> <li>Theme: requirements elicitation</li> <li>Proficiency: writing a requirements elicitation questionnaire</li> </ul>	<ul> <li>Input: requirements elicitation interview transcript</li> <li>Task type: Extended production</li> </ul>	- Input: 20 mins - Task: 30 mins	-Interview transcript including 11 items (questions).	-Analytic scoring rubric -3 criteria for correctness(topical control, language accuracy, rhetorical control)				
	- Task title: collecting relevant information			<ul> <li>0 to 5 pts for each criterion</li> <li>(max. 15/rater)</li> <li>-1 rater (T1 + T2)</li> </ul>				

The test is designed to be useful. In other words, the test was engineered to take into consideration issues related to its construct validity (MOM), reliability (internal and external), and impact (learning-oriented). The anticipated washback is intended to be positive, since the test was designed according to the LOA framework, which informs performance moderators. The test was designed to be delivered online (static), increasing its practicality. The online version of the test can be implemented using Google Forms with pre-programmed feedback including Key answers and enabling tasks scores.

The test aims at measuring learners' ability at writing a basic requirements interview based on student's inferences from authentic input. This requires students to deploy their questioning skills, and engage with a client to gather information about his needs and requirements. By effectively asking open-ended questions, actively listening to the client's responses, and seeking clarification when necessary, students can demonstrate their ability to understand and address the client's needs professionally. This needs assistance to learners through both Input and feedback.

## Conclusion

The complex nature of test development requires careful planning and adaptation throughout the process. We must remember that test development is not a linear process, but rather a cyclical one. It requires constant reassessment and readjustments based on our theoretical development, feedback, and experience, particularly with the rapid emergence of generative AI.

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The test can also be delivered online, with pre-programmed feedback and key answers. The online delivery of the test can solve a number of problems related to practicality, among which we can mention the number of students taking the test, teachers' duties related to invigilation, corrections and deadlines. The online version can also serve as a mock test and the blueprint can be used to create similar assessments, with different input.

The present work aims at providing insight onIntegrated-skills, learning-oriented, ICLHE assessment design, drawing on theory and adhering to quality standards. This achievement test was firmly embedded into a discourse practice in Computer Science, more particularly in Software Engineering. To achieve even higher degrees of quality, ICLHE practitioners can focus on contextualizing assessment around a narrative related to where thetested practice (writing a interview questions to elicit stakeholder's requirements) fits into the domain competencies (e.g. requirements engineering).

#### References

- Bachman, L. and Palmer, A. (2010). Language Assessment in Practice: Developing Language Assessments and Justifying their Use in the Real World. Oxford University Press.
- BOUBRIS, A. A., & HADDAM, F. (2020). Reading Assessment: A Case Study of Teachers' Beliefs and Classroom Evaluative Practices. *Arab World English Journal*, 11 (4) 236-253. DOI: https://dx.doi.org/10.24093/awej/vol11no4.16
- Carr, N. (2011). Designing and Analyzing Language Tests. Oxford, UK: Oxford University Press.
- Purpura, J. E., & Dakin, J. W. (2020). Assessment of the linguistic resources of communication. In C. Chapelle (Ed.), *The Concise Encyclopedia of Applied Linguistics: Assessment and Evaluation* (pp. 1-10). Oxford, UK: Wiley.
- Turner, C. E., & Purpura, J. E. (2016). Learning-oriented assessment in second and foreign language classrooms. In D. Tsagari& J. Banerjee (Eds.), *Handbook of Second Language Assessment* (pp. 255-272). Boston MA: De Gruyter, Inc.