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Utrecht University
Faculty of Humanities

BA THESIS



Roman Peters

**The IAIE Tetrad:
Introducing a Requirements Model
for CALL**

English Language and Culture

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Abstract

This is a graduate thesis for BA English Language and Culture at Utrecht University. The field of Computer Assisted Language Learning (CALL) has introduced many new L2 learning techniques and resources. The various approaches to CALL are often very different from each other and therefore hard to compare, which results in difficulties when trying to pick an appropriate ESL CALL method. Without a structured approach, it is difficult to set the requirements for an effective CALL method. In order to identify the requirements, dependencies between requirements, and strengths and weaknesses of CALL methods, this paper introduces a newly designed framework: *The IAIE Tetrad*. The IAIE Tetrad builds upon literary findings from the multiple theories on language learning. A visualisation of the IAIE Tetrad, called the IAIE Pyramid, can be used to give an overview of the strengths and weaknesses of individual CALL implementations and can be used to compare methods alongside each other.

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1. Introduction

1.1 Computer Assisted Language Learning

The Digital Revolution marked the beginning of the Information Age. The technological advances in the second half of the 20th century, such as the introduction of the Internet, a dramatic increase in computational power and storage, and the simultaneous decrease in computer size and costs, have had a tremendous influence on many aspects of society. An increasing number of tasks move from manual to automatic and from analogue to digital. The education sector is no exception.

While the traditional methods usually remain, computer assisted learning methods have found their way into the classroom. Computer Assisted Language Learning (CALL) ranges from simply typing out words on a computer, to immersive and interactive learning environments. According to Zawacki-Richter, nearly all high schools make use of some form of CALL (2011). CALL differs from traditional language learning in several ways, and has unique capabilities, such as automation and the availability of interactive lessons from home. Some forms of education that were previously only possible with one-on-one assistance of a teacher, can now be done through CALL. Kenning and Kenning have acknowledged the qualities of CALL early on, illustrated with a comparison to traditional learning resources: Tape recordings and books can tell the student what the rules and solutions are, however they cannot analyse and react to the student's input like a teacher can (1983). Computer assisted learning is capable of providing interactive

lessons, in which specific mistakes get analysed in order to deeper understand the underlying principles (M. J. Kenning & Kenning, 1983).

1.2 English as a Second Language

It is estimated that there are 510 million L2 speakers of the English language (Simons & Fennig, 2017). This is over twice as many L2 speakers as in any other language, and 10 million more than the estimated number of native English speakers (Simons & Fennig, 2017).

English as a Second Language (ESL) learners, is the term for non-native learners of English. There are many different learning strategies for ESL students; some more effective than others. Facilitating such a massive number of learners, efficient English teaching methods are a valuable asset. Digital content can easily and freely—at the permission of the copyright holders—be sent over long distances. These are useful features for a target audience that is spread around the globe, such as ESL learners.

1.3 Academic Relevance

In 2005 Farmer and Hughes presented the CASE framework for CALL. The CASE framework is based on sociocultural theories, and provides a method for capturing, modelling and evaluating cognitive and social requirements for CALL. The CASE framework is not suitable for setting the general requirements for an effective CALL method. Since there are many CALL ESL teaching resources and techniques available, a holistic approach to CALL

method requirements, which identifies both strengths and weaknesses, could aid learners in choosing the right CALL method.

According to Beatty, the research area of CALL suffers from fragmentation and there is a necessity for more scientific rigour (2013). Beatty explains that these difficulties occur, due to the relatively young age of the research area and the pursuing of individual agendas by researchers. According to Zhao, the overall research done on CALL, lacks systematicity in recognising the key elements that influence CALL effectiveness (Zhao, 2003).

1.4 Research Method

The aim is to provide a model which can be used to compare different approaches to CALL, and which can identify their strengths and weaknesses. The model this paper provides could be used as a reference for ESL teaching institutes, or learners, for deciding on a CALL approach that suits their needs. The model could also offer guidance in setting the requirements for future CALL methods.

While it was possible to give a comprehensive overview of CALL resources and methods in 1991(Garrett, 1991), much has changed since then, and it would not be feasible to list all contemporary different resources and methods for CALL in this paper. This paper will however feature a selection of important approaches and techniques for CALL, in a coherent manner. The newly designed model should be applicable to the CALL methods listed in section 2.2 and be able to address the following research question:

1. How can we identify the requirements for an effective CALL method for young ESL learners?
2. How can we compare different CALL methods?
3. How do different CALL requirements affect each other?

In order to create a model that addresses these research questions, a thorough understanding of the domain is necessary. Existing language theories can offer a perspective on language learning, which might help in effectively identifying the requirements. In order to assemble relevant academic knowledge, this paper will include a literature analysis on language learning and CALL in the second chapter.

Since the digital world is evolving rapidly, each source for this paper will be evaluated on its relevance by its content and publication year. Much of the anticipated visions of CALL during the dot-com bubble in the late 1990's and early 2000's, did not live up to their expectations (Dobbs, 2002). In order to separate speculations from facts, recent sources on the subject are favoured, where possible. ESL learning in general is a much more mature research area, hence some of the well-established sources on ESL learning used, are dated from before the influx of applied CALL. Most research done on L2 acquisition, is done in the context of ESL (Beatty, 2013). This paper contributes to this imbalance, by also focusing on ESL. The upside of this approach, is that the theories discussed in chapter 2, are applicable to our research. The generalisations made about second language learning and CALL will be used to construct a comprehensive model for evaluating CALL techniques and resources.

There will be no empirical research to this paper. Anything other than the creation of the model, would go beyond the scope of this research, which is set by its imposed time constraint. This paper does provide use cases of real-world applications for the model in section 3.2, which can be used as a foundation for followup research.

2. Theoretical Framework

2.1 Language Learning Theories

Language is a complex field of study. Any language itself is intangible as it is captured in the collective minds of populations. Language can only be studied indirectly through its manifestations in the form of written text, speech, or reactions to those expressions. There are subsystems of language that can be described systematically, such as phonology, syntax, morphology, semantics, pragmatics, rhetoric and orthography (Gass, 2013). It is important to note, that learning strategies may target different aspects of a language. When we are talking about an effective language learning method, we mean a method that improves the learner's production of one or more of the given aspects of a language. Therefore, a language learning method might be valued as effective for some aspects of a language, while being ineffective at other aspects of a language. For instance, reading a book can give many insights on syntax and morphology, without teaching anything on the phonology of a language.

There is much debate on how languages are acquired (Kennison, 2014). Different theories on language acquisition and learning have emerged, without any of them becoming widely accepted as the definitive theory. An overview of both contrasting and supplemental theories, could help give the needed perspective on the subject.

One of the earliest scientific approaches to language acquisition is behaviorism. Behaviourism views the child as a passive recipient, who learns

vocabulary with the pairing of stimulus and response through trial and error (Skinner, 1938; Hummel, 2013). Behaviourism states that language acquisition should only be studied through observable events, rather than mental activity (Skinner, 1953; Lightbown, Spada, Ranta, & Rand, 1993). There has been much critique on the behaviourist views. Most notably by Noam Chomsky, who is credited as the co-creator of the Universal Grammar theory.

Universal Grammar opposes the idea of the learner as a blank slate, and introduces an innate pre-condition for language acquisition. The UG model separates a set of basic properties, shared by all languages and properties which can vary by language. The common grammatical characteristics of languages are already present at birth (Montague, 1970). An argument supporting this theory is known as the poverty of stimulus, which is based on the observation that learners acquire rich linguistic capabilities, from limited linguistic input (Chomsky, 1980; White, 1989). From an L2 perspective, the question arises whether L2 learners still have access to the principals of UG for the target language. Research indicates that, although less prevailing, UG is partially available for L2 speakers (Hawkins & Chan, 1997).

The process of learning a second language is very different from L1 acquisition. Hummel notes that a fundamental difference between L1 and L2 is the age at which the target language is learned (2013). L1 acquisition happens in the earliest stages of life. By definition, L2 learners learn the target language in a later stadium (Hummel, 2013). Because of this age difference, L1 and L2 learners generally adhere very different learning strategies. L2 learners miss their window on critical language learning periods at infancy and early childhood (Birdsong, 2006).

By the time L2 learners learn the target language, they have improved their metalinguistic awareness. This skill can be developed with classroom learning techniques, and allows L2 learners to reflect on and manipulate linguistic features (Hummel, 2013). Another important difference is the ability for L2 learners to fallback to their native language during the learning process. Code-switching between the L1 and the L2 language can help contextualise a learners interactional meaning and create a shared understanding, which is beneficial for language acquisition (Liebscher & Daily-O’Cain, 2005). Prior knowledge from the L1 is likely to affect L2 comprehension and production as well. This cross-linguistic influence can potentially hinder L2 learning, which is known as interference, or negative transfer (Hummel, 2013). Negative transfer could occur for instance when the learner tries to use L1 grammar rules, which do not apply for the L2. However, L1 comprehension might also have a positive effect on L2 learning, which is known as positive transfer (Hummel, 2013). Similarities between the languages might help the learner to easily pick up elements of the L2. The rate of transference increases when the L1 and L2 are linguistically similar (Murphy & Ringbom, 1988). Some notable approaches to L2 learning are contrastive analysis, error analysis, Krashen’s monitor model, information processing and sociocultural theory.

Contrastive Analysis is based on the behaviourist view, which argues that L2 learning is not so different from L1 acquisition. According to theory, the main hindrance in L2 learning is interference, caused by linguistic contrasts between the L1 and L2 (Eckman, 1977). CA highlights these linguistic contrasts in order to predict learner difficulties.

Error analysis focuses on the L2 errors a learner makes, which results in insights into the learner's underlying knowledge of the target language (Corder, 1967; Hummel, 2013). It is important to differentiate between performance errors and competence errors in the analysis. The former can be caused by external factors, such as stress or tiredness, while the latter are systematic linguistic errors (J. Richards, 1971). Research indicates that most errors are not caused by interference from the L1, but rather by over generalisation of the L2 (Hummel, 2013).

Krashen's Monitor Model is a combination of five separate, but related hypotheses. The model has been very influential for language learning, and for L2 classroom practices in particular (J. C. Richards & Rodgers, 2000). Krashen argues against a critical period, and states that L2 learning parallels L1 learning (Kavanagh, 2006).

The first hypothesis from the model is the Acquisition-Learning Hypothesis. Important to note is that Krashen makes a distinction between acquisition and learning. Language acquisition does not occur with learning grammatical rules, but only with meaningful interaction in the target language. Language acquisition is driven by conveying and understanding, not by focusing on form (J. C. Richards & Rodgers, 2000). Learning is conscious effort put into a L2 language, acquisition is an unconscious process.

The second hypothesis of the model is the Monitor Hypothesis. The learning system functions as a monitor for the utterances initiated by acquisition. The role of monitor should be minor (Krashen, 1982). Critics of the hypothesis argue that there is no way of determining the role of learning and acquisition and whether monitoring occurs between the two (Lightbown

et al., 1993).

Krashen's third hypothesis states that language acquisition happens in a natural order. Some structures are acquired before others. This order for the L2 exists regardless of acquirers L1 (Krashen, 1982).

The fourth hypothesis from the Monitor Model is the Input Hypothesis. It states that comprehensible input slightly above the acquirer's current skill level, is a requirement for L2 acquisition (Krashen, 1985).

Krashen's final hypothesis is the Affective Filter Hypothesis. Even if all other hypotheses of the Monitor Model are met for language acquisition—comprehensible input, slightly above the acquirer's ability—the acquirer's attitude can create a filter which hinders language acquisition (J. C. Richards & Rodgers, 2000). The attitudinal variables affecting language acquisition are motivation, self-confidence and anxiety (J. C. Richards & Rodgers, 2000).

The Information processing approach stems from cognitivism. According to cognitivism, the mind has a limited capacity, which is shared amongst the brain its active processes. An important distinction in this approach, lies between controlled and automatic processing. Controlled processing occurs when learning new skills. With enough practice, this skill can shift to automatic processing, requiring far less resources.

2.2 Computer Assisted Language Learning

At its introduction, CALL was deployed using the behaviourist approach. The tasks consisted mainly of repetitive language drills, because these were easy to program (Marie-Madeleine Kenning & Kenning, 1990). Gradually it

evolved to its communicative phase, which leans towards a more interactive approach (Fotos & Browne, 2013). In this phase, a variety of activities based on traditional learning were introduced to CALL, such as vocabulary games and gap filling exercises (Fotos & Browne, 2013). Its next phase was built upon sociocultural theory, and sought to integrate CALL more fully into the language development process (Warschauer & Healey, 1998). Contemporary CALL is not only formed by linguistics, but a variety of disciplines, such as psychology, natural language processing, artificial intelligence and computer science (Thomas, Reinders, & Warschauer, 2013). Much of the early technical limitations have been lifted, which allows for a diverse palette of approaches and techniques.

Computers have become very common in most first world countries, which has helped CALL evolve. Different resources and platforms for CALL have emerged over time, which creates different language learning settings and environments. For instance, thanks to a plethora of language learning apps, it is possible to start learning English from a near limitless rich environment using merely a smart phone and an internet connection.

Golonka organises CALL techniques in four groups: Schoolhouse- or classroom-based technologies, individual study tools, network-based social computing, and mobile and portable devices (Golonka, Bowles, Frank, Richardson, & Freynik, 2012). The following list is compiled from the work of Golonka and the work of Grgurovic (2012; 2013).

Schoolhouse- or classroom-based technologies

Course management system (CMS) An application which can be accessed through a website. Its function is to offer course information and study materials.

Interactive white board A combination of a beamer, whiteboard and computer. Its application is similar to that of a traditional blackboard, but with an added level of digital interactivity.

ePortfolio Archive of the learner's work and results, which can show his or her progress over time.

Individual study tools

Corpus A collection of authentic texts or speech recordings, which can be used as an example for students.

Electronic dictionary An application or plugin which offers functionalities similar to a traditional dictionary.

Electronic gloss or annotation Explanatory or background information added to a text, often implemented in a non-intrusive way.

Intelligent tutoring system An application which offers exercises to the student, and provides instant feedback.

Grammar checker Functionality aimed at providing grammatical feedback on written texts.

Automatic speech recognition Analysis of a learner's recorded speech, which provides feedback on his pronunciation.

Network-based social computing

Serious game A digital game for educational purposes. Players have to complete objectives related to language learning to advance in the game.

Virtual world A digital game with an immersive environment which the player can explore.

Chat A form of online text based communication.

Social media Platform which allows users to connect and communicate with each other online.

Blog Personal website on which users can post their own experiences.

Internet forum or message board Online system which offers asynchronous text communication, which can be used for discussions or questions and answers.

Wiki A platform on which users can post and edit on topics they are knowledgeable on, in order to create a structured information source.

Mobile and portable devices

Tablet or PDA A portable and hand-held personal computer

Smartphone A mobile telephone with added functionality similar to a computer.

E-book Similar to a tablet, but specifically designed for reading. It usually comes with a black and white e-ink display.

This list highlights the wide variety between CALL methods and will be used to illustrate the model introduced in the next chapter.

3. Analysis

3.1 IAIE Tetrad

The requirements model for this paper makes use of the theories discussed in chapter 2. The model, aptly named the IAIE Tetrad, or IAIE model, can be divided in four Key Requirement Values (KRV): *Information*, *availability*, *interaction* and *engagement*. The value of a KRV is measured by weighing the advantages and disadvantages within its domain. We will refer to these requirements within the KRV's domain as its attributes. Each KRV is influenced by its own attributes and by the KRV supporting it in the model, as shown in figure 3.1. Each KRV is essential for a CALL method to be effective.

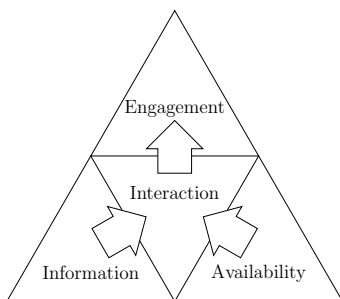


Figure 3.1: IAIE Pyramid with the four KRVs and their relations.

The IAIE model is meant for analysing ESL CALL methods. A CALL method is an intentionally vague term, which includes any technique listed in section 2.2, a combination of such techniques, or a combination with traditional methods (blended learning). The model is aimed towards the ESL learner; the KRV scopes have a direct relationship with the learner.

This means that, for instance, technical aspects are intentionally left out. The learner does not directly interact with the technical details underlying the learning method, and therefore does not have to worry about them. In some cases technical limitations might limit normal operation. The threat is then represented in the model as lowering *availability*, *interaction*, and/or *engagement*, since it then does affect the user, although indirectly.

Aside from the dependencies visualised in the structure of the IAIE Pyramid, the KRV are related in other ways. Figure 3.1 shows a Venn diagram based visualisation, which includes super-groups the KRVs can be placed in. Dynamic and static content is delivered by *interaction* and *information*. Functional requirements, e.g. requirements stating the behaviour of a system, are provided by *availability*, *information* and *interaction*. *Interaction* and *engagement* are the human-computer interaction components. Together they form the non-functional requirements, which relate to the operation of the system.

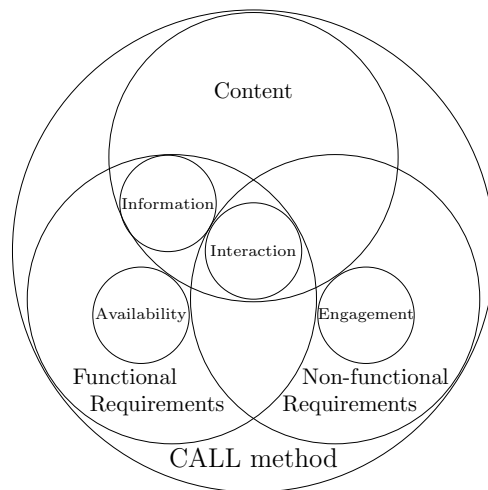


Figure 3.2: IAIE visualisation, showing the broader scope relations between KRVs.

3.1.1 Information

The CALL method should contain information relevant and useful to the learner. *Information* can be seen as the educational content of a CALL method. In most methods the *information* is represented by the text or exercises presented to the user. In compliance with the Input Hypothesis, the information, or content, should be comprehensible and slightly above the learner's current conversational level. *Information* is directly connected to the *interaction KRV*. If for instance the learning curve is either too deep or not deep enough, it will hinder *interaction* which ultimately will lead to a decrease in *engagement*.

Another factor is the richness of the *information*. If the variety is limited, the lack of rich input for the learner will negatively affect the learning process. Another consequence might be a decrease in *engagement*, because the user does not feel challenged. Richness also includes the variety of language learning skills utilised by the approach. Reading skills, writing skills, speaking skills, listening skills and grammar development are all important aspects of language learning (Hardisty & Windeatt, 1989).

3.1.2 Availability

The CALL method should, over time, be available to the learner using only a device with an internet connection. There are several factors that can hinder *availability*. For instance the method might use proprietary software, which might not be affordable to everyone alike, or it might only be available in certain countries. The latter should not be a limitation for online distribu-

tion of software based CALL methods, such as the individual study tools mentioned in section 2.2. However, other CALL methods, such as classroom based CALL activities or those relying on specialised hardware, are per definition less available. Naturally, a CALL method with limited *availability* is not necessarily a bad method, however it has to excel in one or more of the other KRVs in order to be considered for adoption. An important factor for *availability* is the platform used by the method. In this model, *availability* also includes reliability. If the method is not reliably accessible by the learner, it decreases *availability*.

3.1.3 Interaction

The CALL method should dynamically interact with the user. *Interaction* is the interplay between computer input and output. Computer output in the form of feedback, can be seen as the dynamic content of a CALL method. Important measurements for *interaction* are accuracy and reliability. The CALL method must be able to accurately and reliably provide feedback to the user. In most cases, *interaction* is what differentiates CALL most from traditional methods. *Interaction* relies on the *information* a system has. A CALL method which only outputs *information*, while doing nothing with the input from the user, is generally of the same value as a static text book. In those cases the method will only be valuable if it provides significant increases in other KRVs. For example, a Wiki has very little *interaction* with the user, because it mostly just provides the *information*, without feedback. However it does offer improvements over some traditional sources. It has an

increased *information value* because it is crowd-sourced and easily updated, and an increased *availability value* since it is freely accessible on the web. Another example: The only use of user input an electronic dictionary has, is for looking up the requested words, it has no tutoring component. However, the ease of looking up words improves *availability*, and since *interaction* and *engagement* are dependant on that, they might improve as well. This would, without looking at any negative features the method might have, place an electronic dictionary above a traditional dictionary. Since there are CALL methods with very limited *interaction*, it might seem like a softer requirement than the other KRVs, however from the perspective of the sociocultural theory, it is absolutely necessary. Additionally, *interaction* also strongly influences *engagement*. *Interaction* is the KRV domain affected most by either technical limitations or technological progress, and as such should see the most improvements with future iterations of CALL technology. For instance, in the past, improvements in Natural Language Processing have improved the error analysis of intelligent CALL systems (Holland, 2013).

3.1.4 Engagement

The CALL method should interact with the user in an engaging manner. *Engagement* is a combination of the *interaction value* and the user's reaction. According to Krashen's Filter Hypothesis, language acquisition can only take place when the user is motivated enough. Since *engagement* relies on user motivation and input, it will often be the most difficult KRV to assess. It can be valued by researching the CALL implementation's user experience. An

attribute which highers *engagement*, is when the CALL method is perceived as rewarding. For instance, if the system's *interaction* allows for the learner to see the progress he has made, it might form a source of motivation, thus increasing *engagement*. Other examples affecting the *interaction*, are ease-of-use, solo or group exercises, and individual attention, If learners get excluded from the method, for example because the *information* is not suitable for their age, or it does not adapt well to their culture, it will lower the *interaction value*. Although *engagement* is the final KRV, which means it is influenced by all other KRVs, its value is not the sole outcome of the IAIE model. The IAIE model should be evaluated as a whole; each KRV taken into account.

3.2 Use Cases

The IAIE model can be used to gain insight in the strengths and weaknesses of a CALL method. The first step is to rank each KRV of the method, by weighing all the attributes affecting it. Since it would be difficult to set an exact value for the KRVs, it can be expressed as *high*, *moderate* or *low*. High meaning little to no conflicts regarding the KRV and the elements determining it and low indicating a lacking implementation of the KRV's attributes. An overview of the method's quality can be visualised by colour coding the values in the IAIE Pyramid. In figure 3.3 and 3.4 the following colour coding is applied:

 High  Moderate  Low

In figure 3.3 the KRVs for using Wiki's as a CALL learning method are colour coded. In this case the *engagement* is low, because it is missing support

from the *interaction*, which is also low. Wiki's are very uniform, offering the same attributes, which makes it possible to give a general colour coded IAIE Pyramid. In most other cases the attributes making up the KRVs strongly vary per implementation.

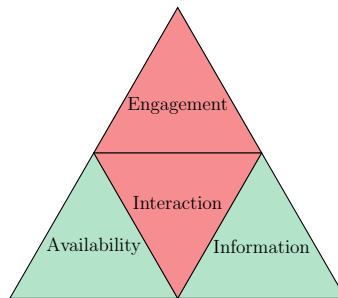


Figure 3.3: Wiki IAIE Pyramid example.

Figure 3.4 shows another example of an IAIE Pyramid, this time colour coded for the implementation of a serious game. In this example case, the serious game is online available and free-to-play, which results in a high *availability*. However, the imagined game lacks in *information* content; the exercises are limited and not very diverse. Even though the implementation of the content is well done, with accurate and in-depth feedback on user input, the lack of support from the *information* KRV lowers the *interaction* value as well. The learner is well engaged with the game at first, because it is fun to play, however the dependency on *information* is felt at the top of the pyramid as well. After the learner has finished all the different exercises, he will get bored with the repetition, resulting in moderate *engagement*.

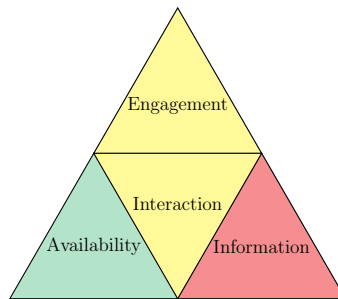


Figure 3.4: Serious game IAIE Pyramid example.

This example illustrates that the KRV situated lower in the pyramid often influence the KRV higher up. A lack of support from the lower KRV, does not necessarily mean that top KRV is low as well, since there are multiple factors involved. For instance, the learner might not get bored with the game at all, because the exercises are implemented in a way that makes the learner feel like he or she is still making progress, or the learner might not mind the repetition as much.

4. Conclusion

The IAIE Tetrad can be used as guidance in examining the requirements for CALL methods. According to the model, a CALL method can be valued by its Key Requirement Values: Information, availability, interaction and engagement. Each KRV represents the value of a method within its own domain. The model offers a structured approach for examining CALL methods, which results in a comprehensive overview of its strengths and weaknesses. The IAIE Pyramid is visualisation of the model which gives an overview of the measured values, and which might explain dependencies between requirements. Unrelated CALL methods can be compared by comparing their IAIE Pyramid visualisations, comparing the sum of their KRVs and highlighting their contrasts. This could be useful in deciding which CALL method to use, since the methods might otherwise be difficult to compare.

4.1 Limitations

In using the IAIE model, it is necessary to determine the KRVs. The KRVs are formed by multiple factors, some obvious and some hidden at first. The KRV should represent the result of all factors combined. Even though there are only three different value levels to choose from, it might still be hard to weigh the effect of all underlying factors. KRVs will often differ even between implementations of the same CALL technique. Therefore the framework is best suited for evaluating specific implementations, as opposed to general CALL methods.

The theories discussed in chapter 2, on which the model builds, are aimed at young ESL learners. As a result, the IAIE model is aimed at the same target group. Applying the model to a different target group might skew the the results, making it an impractical tool for comparing CALL method effectiveness. For instance, *engagement* might be valued differently for adult learners, because they might need less motivation.

The framework has not been tested in the field, so further research is needed to examine the practicality and usefulness of the framework when applied.

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Bibliography

- Beatty, K. (2013). *Teaching & Researching: Computer-assisted language learning*. Florence: Taylor and Francis. doi:10.1111/j.1467-8535.2011.01187_4.x
- Birdsong, D. (2006). Age and Second Language Acquisition and Processing: A Selective Overview. *Language Learning*, 56(s1), 9–49. doi:10.1111/j.1467-9922.2006.00353.x
- Chomsky, N. (1980). Rules and Representations. *Behavioral and Brain Sciences*, 3(01), 1–15. doi:10.1017/s0140525x00001515
- Corder, S. P. (1967). The Significance of Learner's Errors. *IRAL-International Review of Applied Linguistics in Language Teaching*, 5(1-4), 161–170. doi:10.1515/iral.1967.5.1-4.161
- Dobbs, K. (2002). The State of Online Learning—What the Online World Needs Now: Quality. *The ASTD E-learning Handbook*, 357–72.
- Eckman, F. R. (1977). Markedness and the Contrastive Analysis Hypothesis. *Language learning*, 27(2), 315–330. doi:10.1111/j.1467-1770.1977.tb00124.x
- Farmer, R. A. & Hughes, B. (2005). CASE. In *Proceedings of the 6th ACM SIGCHI new zealand chapter's international conference on computer-human interaction making CHI natural - CHINZ '05*. ACM Press. doi:10.1145/1073943.1073956
- Fotos, S. & Browne, C. M. (2013). *New Perspectives on CALL for Second Language Classrooms*. Routledge.
- Garrett, N. (1991). Technology in the Service of Language Learning: Trends and Issues. *The Modern Language Journal*, 75(1), 74–101. doi:10.2307/329836
- Gass, S. M. (2013). *Second Language Acquisition: An Introductory Course*. Routledge. doi:10.4324/9780203137093
- Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2012). Technologies for Foreign Language Learning: A Review of Technology Types and their Effectiveness. *Computer Assisted Language Learning*, 27(1), 70–105. doi:10.1080/09588221.2012.700315
- Grgurović, M., Chapelle, C. A., & Shelley, M. C. (2013). A Meta-Analysis of Effectiveness Studies on Computer Technology-Supported Language Learning. *ReCALL*, 25(02), 165–198. doi:10.1017/s0958344013000013
- Hardisty, D. & Windeatt, S. (1989). *Computer Assisted Language Learning*. Oxford OUP.
- Hawkins, R. & Chan, C. Y.-h. (1997). The Partial Availability of Universal Grammar in Second Language Acquisition: The 'Failed Function-

- al Features Hypothesis'. *Second Language Research*, 13(3), 187–226. doi:10.1191/026765897671476153
- Holland, V. M. (2013). *Intelligent Language Tutors: Theory Shaping Technology*. Routledge.
- Hummel, K. M. (2013). *Introducing Second Language Acquisition: Perspectives and Practices*. John Wiley & Sons.
- Kavanagh, B. (2006). The Input Hypothesis (Krashen, 1982, 1985). 7(2), 241–248.
- Kenning, M.-M. [Marie-Madeleine] & Kenning, M. J. (1990). *Computers and Language Learning: Current Theory and Practice*. Horwood.
- Kenning, M. J. & Kenning, M.-M. (1983). *Introduction to Computer Assisted Language Teaching*. Oxford Univ Pr.
- Kennison, S. M. (2014). *Introduction to Language Development*. SAGE Publications, Ltd. doi:10.4135/9781506374499
- Krashen, S. (1982). Principles and Practice in Second Language Acquisition.
- Krashen, S. (1985). *The Input Hypothesis: Issues and Implications*. Addison-Wesley Longman Ltd.
- Liebscher, G. & Daily-O'Cain, J. (2005). Learner Code-Switching in the Content-based Foreign Language Classroom. *The Modern Language Journal*, 89(2), 234–247. doi:10.1111/j.1540-4781.2005.00277.x
- Lightbown, P. M., Spada, N., Ranta, L., & Rand, J. (1993). *How Languages are Learned*. Oxford Univ Press Oxford.
- Montague, R. (1970). Universal Grammar. *Theoria*, 36(3), 373–398.
- Murphy, J. A. & Ringbom, H. (1988). *The Role of First Language in Foreign Language Learning*. Wiley-Blackwell. doi:10.2307/327765
- Richards, J. (1971). Error Analysis and Second Language Strategies.
- Richards, J. C. & Rodgers, T. S. (2000). *Approaches and Methods in Language Teaching*. Cambridge Univ Press. doi:10.1017/cbo9780511667305.004
- Simons, G. F. & Fennig, C. D. (2017). Ethnologue: Languages of the World, Twentieth edition. Retrieved from <https://www.ethnologue.com>
- Skinner, B. F. (1938). *The Behaviour of Organisms: An Experimental Analysis*. D. Appleton-Century Company Incorporated.
- Skinner, B. F. (1953). *Science and Human Behavior*. Simon and Schuster.
- Thomas, M., Reinders, H., & Warschauer, M. (2013). Contemporary Computer Assisted Language Learning: The Role of Digital Media and Incremental Change. *Contemporary computer-assisted language learning*, 30–47.
- Warschauer, M. & Healey, D. (1998). Computers and Language Learning: An Overview. *Language teaching*, 31(02), 57–71. doi:10.1017/s0261444800012970

- White, L. (1989). *Universal Grammar and Second Language Acquisition*. Cambridge University Press. doi:10.1017/cbo9780511815065.002
- Zawacki-Richter, O., Baecker, E. M., & Hanft, A. (2011). Validation of Competencies in E-Portfolios: A Qualitative Analysis. *The International Review of Research in Open and Distributed Learning*, 12(1), 42–60. doi:10.19173/irrodl.v12i1.893
- Zhao, Y. (2003). Recent Developments in Technology and Language Learning: A Literature Review and Meta-Analysis. *CALICO journal*, 7–27.