Error Analysis in a New Context:

A Discourse Study of Errors in General Linguistics and CALL

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ABSTRACT

This study investigated the nature of error analysis in the application of computer in second language learning. Nowadays, this discipline is named Computer Assisted Language Learning (CALL). Whileerror analysis theory in general linguistics has already been defined (e.g.:Menyuk, 1971; Dulay, Burt &Krashen, 1982; Keshavarz, 2011) there is no clear and accredited error analysis theory or classification in CALL yet. So this study has been conducted to see whether the nature of errors in CALL is differed from that of general linguistics or not. In this study, after an overall introduction to error analysis, error analysis in CALL has been investigated. The findings suggest that a new classification of error types in CALL can be proposed.

Keywords: *Error analysis, CALL, Language, Computer, Linguistics*

1. INTRODUCTION

"Creating intelligence comparable with their own has been one of the oldest dreams of mankind, starting from the legend of Golem, a man made of clay and summoned to life through Kabala, or Galatea, a sculpture so life-like that even Gods felt it should be made alive" (Dodigovic, 2005, p. 100). Dodigovic(2005) after considering the logic and nature of

decision making of this intelligent machine considers the significant role of Language in the

birth of the concept of artificial intelligence. This concept of artificial intelligence, which nowadays is named computer, plays an important role in second language learning. It works as a tireless language model, translator, error detector and corrector ,and grading authority. The discipline that is pertinent to this endeavor is nowadays, generally, recognized Iranian EFL Journal 333 as Computer Assisted Language Learning (CALL), which is studied in Computational linguistics. Computational linguistic is the 'application of computers to the study of linguistic problems' (O'Grady et al, 1997, p.660). O'Grady et al, (1997) further explain that it has two goals: (1) to use the computer as a tool to build programs that model and test a particular linguistic theory or approach and (2), to build working systems that use linguistic information. Holland et al. (1993) discuss the advantages of computer programs capable of analyzing human language in practicing the receptive skills of listening and reading and that of the productive skills of writing and speaking (p.28-46).While the former is studied by traditional CALL, the latter is the subject matter of the intelligent CALL.Dodigovic(2005) states that CALL would do what good human tutors frequently do: point out obvious linguistic errors and provide individualized feedback, correction, and ramification (p.96).

The study of linguistic errors is studied through the framework of the weak version of Contrastive Analysis (CA).According to Keshavarz (2011),itis theoretically justifiable and pedagogically practical."Thisapproach that is based on theories of first and second language acquisition and possible similarities between them became known an Error Analysis (Keshavarz, 2011, p.52)".Erroranalysis emerged as a reaction to the view of L2 learning suggested by CA theory that considered language transfer as the main process involved in L2 learning.Keshavarz(2011) adds that "it is widely believed that language learning, like acquiring virtuallyany other human learning, involves the making of Errors" (p.53). After arguing about using error analysis as the primary pedagogical tool, Keshavarz (2011) concludes that error analysis is based on three important assumptions:

1. Errors are inevitable, as we cannot learn a language without committing errors.

2. Errors are significant in different ways.

3. Not all errors are attributable to the leaner's mother tongue.

In this study after considering schools of thought in respect of learners' errors and important concepts related to error analysis, error analysis in CALL and treatment of errors in the application of computer in language learning and teaching will be discussed.

2. Schools of Thought in respect of Learners' Errors

In the field of methodology there have been two schools of thought with respect learners' errors (Corder, 1967, p.162). The behaviorist school believes that the occurrence of learner's

errors must be avoided; otherwise they would become a habit for the learner and manifest a sign of the inadequacy of teaching methods. With this view, contrastive analysis of the native

and the target language has become an important aspect of studying the language differences (Kirkgoz, 2010, p. 4353). In contrast to this view, the cognitive school maintains that Iranian EFL Journal 334 occurrences of errors are inevitable, and this is a sign of learner's progress in the language learning system. Corder(1967) statesthat "the philosophy of this school is that we live in an imperfect world and consequently, errors will always occur in spite of our best efforts" (p.163). With this view, the cognitivist emphasis was on hypothesis formation, experiment, feedback, and raising the concept of error analysis as a way to scrutinize difficulties encountered by the second language learners.

3. Errors and Mistakes

*Many scholars in the field of error analysis differentiated between errors and mistakes; however, the boundary between them is blurred. Corder (1967) arguing about the differences between Error and Mistake, states that only the situational context could show whether an utterance is an error or not. For Corder(1967), errors reflect the L2 competence of the learner, and mistakes reflect performance and are self-correctable. "Errors are considered to be systematic, governed by rule, and appear because a learner's knowledge of the rules of the target language is complete" (Keshavarz, 2011, p.55). In comparison with errors, mistakes are random deviations, unsystematic, and are due to non-linguistics factors such fatigue, strong emotion, and memory limitation. Self-correctability is another criterion taken by James(1998) to make a distinction between errors and mistakes. According to James "mistakes can be corrected by the learners if their attentions were drawn to them, but errors cannot be self-corrected"(p.57**).**

4. Significance of Errors

From studying errors made by the second language learners, it is possible to get some information about the target language at a given point to discover what they have learnt. Historically speaking, the best explanation of the significance of errors has been given by

Corder(1967).

Richards (1971) reiterates Corder's view and remarked that errors are significant and of interest to Linguists, Psycholinguists and teachers. Inregard to the native child and the second language learner Keshavarz (2011) claims that the study of errors, is crucially important because errors were seen as evidence of the processes and strategies of language acquisition. The other significance of studying errors is the feedback, through which learners' hypothesis about the target language will be tested and modified.

Errors are significant in three different ways. First to the teacher, in that they tell him, how far towards the goal the learner has progressed. Second, they provide to the researcher evidence of how language is learned or acquired. Thirdly (and the most important one), they are indispensable to the learner himself, because we can regard the making of errors as a device, the learner uses in order to learn (Corder, 1967, p.167). ***5.***

5. Purpose of Error Analysis

According to Corder (1967) learner's errors can serve two purposes, diagnostic, and prognostic (p.163). It is diagnostic because it can tell us the learners understanding of a language at any given point during the learning process. It is also prognostic because it can

tell the teacher to modify learning materials to face with the learners' problem. ForCorder(1967), explanation is the ultimate goal of error analysis. James (1998) defines diagnosis as the task of inferring the sources of errors, while accurate description of errors is

regarded as a separate task. According to Johanson (1975), error analysis is the best tool for describing and explaining errors made by second or foreign language learner.

The field of error analysis is divided into two branches: (i) theoretical, and (ii) applied. Corder (1973) mentions the notion of universality in meeting the objective of theoretical error analysis. Keshavraz (2011) states the study of errors is part of the psycholinguistic search for the universal processes of second language learning.

"Determining the sequence of the presentation of target language items in textbooks and classrooms, deciding the relative degree of emphasis on material, devising remedial lessons and exercises and finally selecting items for testing the learner's proficiency are the goals of applied analysis of errors" (Sridhar, 1981, p. 221). Then the objective of applied error analysis is purely practical and pedagogical.

6. Classification of Errors

In any study of error analysis, errors have to be classified to find what kinds of errors occur more often than what others do. The task, however, is not as easy as it seems. Many of the models in error analysis classify errors into linguistic categories and then sub or sub-sub categories in hierarchical order. Keshavarz (2011) classified errors into categories and subcategories; the main classification is Linguistic-based classification and &Process based classification.

The first category is subcategorized to orthographic, phonological, lexico-semantic and morpho-syntactic (Table 1). The second one is classified according to the process of language learning, i.e. the way through which language learners make errors. The four major processes that lead to erroneous constructions, cited in the literature (Corder, 1973; McKeating, 1981; Brown, 1980; Keshavarz, 1993) are omission, addition, substitution, and permutation (Table 2).

In another category, errors can be classified as receptive and productive. Receptive errors are attributed to listener's misunderstanding of the speaker's intention, and productive errors are related to the language learners' utterances.

7. Source of Errors

In Contrastive analysis literature, the major cause of errors was interference from the learner's native language, but it is by no means considered to be the sole source for making errors. Lightbown & Spada (2010) suggested that the first language is not the single influence on second language learning, learners from different language backgrounds often make the same kind of errors, and some of these errors are remarkably similar to those made by first language learners. An investigation into the types of errors reveals that the sources of errors may be attributed to two major transfers: interlingual and intralingual transfer (Brown, 1980).

The initial stages of learning a second language are characterized by interlingual transfer from native language. Brown (1980) suggested that before the learner becomes familiar with the system of L2, the native language is the only linguistic system upon which the language learner can draw (interlingual error). On the other hand, Richards (1974) consider intralingual errorsas negative transfer of language items within the target language.

Furthermore, Richards (1971) cites four major types or causes of intralingual (developmental) errors:

(1) Overgeneralization: overgeneralization is a process, in which a learner extends the use of a grammatical rule beyond its accepted uses. (Richards et al, 1989).

(2) Incomplete application of rules:It involves the application of rules to contexts where they do not apply.These kinds of errors lead to systematic errors (Meenakshi, 2004, p.18). Subject-verb agreement can be one example of this type of error.

(3) Ignorance of rule restrictions: This type of error is due to the learner's ignorance of the restrictions of and exceptions to general target language rules.

(4) False concepts hypothesized: False concepts hypothesized occur when learners do not completely understand a distinction in the target language. (Ellis, 1996; Richards, 1995).This concept is named False Analogy by Keshavarz (2011). Later, Richards (1974) reiterated six sources of errors, that is to say, (1) overgeneralization, (2) interference, (3) performance errors and markers of transitional competence, (4) strategies of communication and assimilation and (6) teacher-induced errors.

In another study by Schuman &Stenson (1974), they stated three major causes of errors. (1) Incomplete acquisition of the target grammar, (2) exigencies of the learning/ teaching situation and (3) errors due to normal problems of language performance.In a more recent classification by Keshavarz(2011), in which classification is based on the primary causes of errors, he presented a more comprehensive taxonomy of the sources of errors. However, there are some degrees of overlapping with previous categorization (Figure 1).

8. Steps in Error Analysis

One of the most common problems in understanding the linguistic systems of both L1 & L2 learners is the fact that such systems are not directly observable. However, they can be inferred by analyzing comprehension and production data. Compared to research on language comprehension, there is as yet not that much experimental research on language production (Schmitt, 2002, p.139). One reason is, the kind of careful manipulation of the stimuli in comprehension studies, cannot be done in a similar way in language production. In contrast, in the area of Error Analysis Keshavarz (2011) states, in general it is easier to detect productive errors, i.e., errors that occur in the speech or writing of the second language learner as opposed to errors in the receptive skills, i.e. reading and listening comprehension. This is because productive linguistic behavior is easily observable, whereas receptive behavior is not. Therefore, in determining steps in error analysis the kind of data, i.e. comprehension or production data should be taken into account.

Corder (1974) specified three steps in practical aspects of error analysis.

(1) Collection of sample errors

Here the corpus of language is selected for erroranalysis. Thecorpus should be adequate for any error analysis.There are certain procedures for collecting data, Keshavarz(2011) arguing about two types of data-collecting procedures: (a) spontaneous, and (b) elicited, states that the job of such procedures is either to provoke a language learner into producing linguistic response or to examine his intuition regarding the grammaticality of an utterance presented to him.

(2) Identification of errors

Corder (197) proposed a model for identification of erroneous or idiosyncratic utterances in a second language. According to this model, any sentence uttered by the learner and subsequently transcribed can be analyzed for idiosyncrasies.Here a distinction is made between overt and covert errors.The difficulties lie in the fact that what sounds like an acceptable utterance may contain errors. Such utterances may seem grammatical and acceptable at the sentence level (overtly erroneous), but unacceptable in intersentiallevel (covertly erroneous).

(3) Description of errors

Here an explanation and interpretation of learners' errors will be put forward. If the learners are accessible, we can identify his intention by asking him to express his intention in his mother tongue. Keshavarz(2011) named this, an authoritative interpretation and an authoritative reconstruction of the learner' sentence in an acceptable form. However, if we

don't have accesses to the learners, we had to infer what they intended to say from his utterance, its context and his knowledge of the target language. This is called a plausible interpretation, and the corresponding reconstruction is only a plausible reconstruction (Keshavarz, 2011, p.79).

9. Error Correction

Different second language acquisition theories have different views toward the language errors produced by a second language learner. The behavioristic theory states that errors should be avoided at all cost, i.e.through overlearning. In contrast, interlanguage theorists see

errors as idiosyncrasies in the learner's L2 system, which should be considered only in regard to the target language.Both interactionalists and cognitivists believe that focusing the learner's attention to the correct form will activate learning. For Corder (1967), errors are the evidence of the leaner's internal syllabus and the imminent difference between input and intake. To James (1998), error correction has three different degrees: intervention feedback, correction proper and remediation.

In the first level, the learner through intervention feedback is informed that there is an error, which is left to be corrected by a learner him/herself.The correction proper provides treatment, which lead to correction and revision of that particular error. The third level or degree of error correction provides the learner with information that allows him/her to revise the linguistic rule.Both of the correction proper and remediation draw the learner's attention to the problem (Ellis, 1996; Mitchel & Myles, 1998) and offercovert(implicit) or overt (explicit) ways to the solution. Dodigovic (2005) states that James (1998) criterion for the division is the diagnostic power of error treatment. Considering these points some suggestions for error correction can be proposed.

Whenever correction or improvement is done, great consideration should be given to

individual differences. Garrett (1995), Oxford (1995) and James (1998) point out that individual difference between learners may play a major role in specifying what kind of feedback is more effective. The other criterion proposed by Huang (2002) is the context in which error correction or improvement is done. The next criterion is the intensity of error. Zamel (1985) states that distinguishing between minor and serious errors may be a good guide in deciding what to correct. Presuppositions (a set of extralingiuistic facts), learner intended and pragmatic meaning, should also be taken into account in any correction and improvement.

10. Errors in CALL

When speaking about linguistic errors in CALL, 'detection', ' identification', 'correction' and 'diagnosis' of errors are important concepts, which should be taken into account. Clear

Iranian EFL Journal 339 definitions of such terms are rarely provided in CALL. Then establishing a link between theories of error analysis in general linguistic and that of CALL seems to be very difficult. In the worst case, they are not existent and in the best case, they are implicit and are not clear.

The need for error diagnosis in CALL like any other second language learning way in order to provide convenient feedback is vital. Reliable error diagnosis systems would allow users/authors to overcome the limitation of multiple-choice questions and fill-in-the-blanks types of exercises and to present the more communicative tasks to learners (L'Haire&Faltin, 2003, 481).One of the earliest known programs for educational purposes that were dealing with human language was Page's Project Essay Grade (PEG), launched in 1966. The program could grade student essays with the reliability similar to the human graders' reliability. As well as the numerous versions of PEG, alternative programs emerged over the years. Among them,Latent Semantic analysis or Latent Semantic Indexing which is a mathematical/ statistical technique for extracting and representing the similarity of meaning of words and passages by analysis of large bodies of text, e-rater, question answering system and short answer system can be mentioned. In any case, fluency is measured in different words used, total number of words, commas and the number of sentences; spelling is considered by

difference between common and uncommon words; diction is based on word length; sentence structure is represented by the number of sentences and mean sentence'slength, and punctuation is expressed as frequency of punctuation signs and paragraph development is indicated by the number of paragraphs and mean length of them.

One of the features and uses of these programs is that students can enter their essays into an online format and receive immediate feedback, which includes the grade and suggestions for revision. The style module indicates redundant and malformed sentences, and the mechanic's module indicates grammatical and spelling errors. Miller (2003) reports that students like getting instant feedback and consequently, being able to improve their writing. Moreover, e-rater has been successfully used in the grading of non-native speaker writing within the framework of Test of Written English (Dodigovic, 2005, p.104).However, there are two types of concerns on automatic essay grading. According toWresch (1993), the first one came from the efforts to introduce creativity into writing and move away from the grammar and punctuation, and the other type of concern arises from the social theories of learning that focus mainly on communicative language learning and practice. The same concerns can be attributed to error analysis in CALL, according to Tschichold (2003), at least at the moment, what is left for computers to do, is to focus on low-level errors of spelling, morphology, and certain parts of syntax (p.551). So it can be suggested that in this regard, CALL does not look at the sentence as whole but as sum of isolated elements. Furthermore, many of these programs are developed for assessment purpose, rather than learning. So the need for a more "learning-focused" error analysis program is crucial.

The next step in the process is giving feedback in regard to the identified error which will be discussed in the next section.

11. Feedback and reinforcement in CALL

In the following, one of the crucial terms within the context of learner errors, particularly those which are related to CALL will be discussed. For instance, the term feedback has been defined differently in this particular context. James (1998) defines the term feedback as a

specific type of response to error, but gives no specific description or diagnosis. On the other hand,many other SLA theorists (Spada&Lightbow, 1993; Ellis, 1997; Doughty, 2001; Gregg, 2001) and the majority of CALL specialists (Heift& Schulze, 2003; Cowan et al, 2003;Maingard,1999; Kreindler, 1998),seem to extend the meaning of the term to include any type of information returned to the learner after accomplishing production or comprehension task.Instrumental conditioning theory gives the meaning of feedback as the link between stimulus and response. On the other hand, it seems that the term feedback in cognitive psychology does not have the same significance. Behaviorism related the term feedback to term 'reinforcement'. "In CALL, the emphasis may have initially been on the behavioristic sense of the term feedback" (Dodigovic, 2005, p.93). Kreindler (1998) states that simple correct/incorrect feedback had been the type of response that CALL programs offered most frequently.

12. Treatment of Errors in CALL

Modern computers allow the students to practice and get feedback on both their written and spoken output. Here the major trends in written and spoken error identification and treatment within the framework of CALL will be analyzed.

12.1. Written Errors

Considering written errors, Dodigovic (2005) identifies three ways in which a computer can identify and treat a linguistic error produced by a L2 learner.

The base of Pattern matching is the student's output which is compared against a list of pre-determined and expected answers. A CALL program that takes advantage of this technology is Understanding Spoken Japanese (Yoshii & Milne, 1995). It involves an Answer It can either perform a pattern matching operation; use a parser or a hybrid system in which parsing is combined with string matching in an efficient way. Parsing itself can be performed by variety parser types. It can also vary according to the way it recognizes and responds to errors or can have a modularity which allows it to take the linguistic levels of the student's output separately and therefore perhaps more efficiently. (Dodigovic, 2005, p.109).

Pattern Manager (APM), which allows a user to detect a wide variety of misspelling, to identify the incorrect word order, to detect missing sentence's parts and to handle a combination of the above. Before going further, it is essential to define parser which is a concept in CALL. Hollandet al. (1993) define parsers as NLP(Natural Language Processing)engines, which compose and decompose natural language utterances by using the rules which represent syntax thus addressing the sentence structures in a language. Parser takesinput in sentence length, break it down into components, and map these against a computational grammar. According to Holland et al. (1993), the output is a structural analysis that tells whether and to which rules the sentences fit. We have so far defined parser and examined the way in which a parser can identify an error. The next step is giving feedback in regard to the identified error. Some CALL specialists believe in giving feedback to only one error per utterance at a time (for example, example Holland et.al.1993); others feel more relaxed about this issue. Here it is essential to distinguish between the primary error and all other errors. The primary errors, which are considered communicatively significant, receive feedback per default, while secondary errors are not considered communicatively significant and therefore, feedback to those errors is optional. The feedback given to L2 learner should have some characteristics. Van der Linden (1993, cited in Heift, 2003)made three recommendations regarding CALL feedback:(1) feedback needs to be the accurate, (2) one error message at a time should be displayed, and (3) explanations for a particular error should be kept short. Reeder et. al.(1999) states that error feedback in ICALL should be more conversational. These authors are in contrast these view that the system should respond in a way that acknowledges both error identification and correction. It can be concluded, according to Dodigovic (2004), that intelligent error identification and diagnosis systems, as far as written language is concerned, can be quite sophisticated and use a number of subsystems combined with a variety of processing levels, making them almost human and truly intelligent.

12.2. Speech Errors

"Below a certain level, even if grammar and vocabulary are completely correct, effective communication cannot take place without correct pronunciation"(Eskenazi, 1999, p.62).When dealing with error diagnosis and correction of speaking skill in CALL, we should consider computational phonetics and phonology. Computational phonetics and phonology are sub-discipline of computational linguistics that is applied in two distinctive approaches: speech synthesis and speech analysis. Speech-related error analysis can be based on these two approaches. In both of them, linguistic knowledge at the phonological, lexical, semantic, grammatical and pragmatic level should be taken into account.

Ehsani&Knodt (1998) discussing the role of computers in correcting language errors state that in the area of pronunciation computers can capture deviations from the expected and provide feedback that does not depend on the student's own perception. This is applicable on both the segmental and supersegmental level.Suprasegmental features include pitch, intonation, stress and rhythm; segmental features are quality, duration, pitch and loudness. Following the traditional theoretical linguistics in the past which focused on speech sounds (segmental), a number of early CALL programs also focus on the segmental level. Such kind of distinctions could be invaluable when making decisions of what kind of feedback a system may offer.

13. CONCLUSION

Computershave played a significant role in educational setting and second language learning is not an exception. Nowadays, we can see automated evaluation systems and e-raters, which are both cost-effective and reliable. In this paper,I discussed a brief review of error analysis in general linguistics and that of CALL in particular. While error analysis theory in general linguistic has been defined long time, as far as this study is concerned, there is no clear and accreditederror analysis theory or classification in CALL. I also discussed the significance of error and error correction both in general linguistic and CALL. Errors serve as an important way for researchers and teachers to see the learning process and learning strategies used by a

second language learner.As educational systems look for new ways to use technologies in classrooms, a new genre can be defined for both written and spoken language in CALL and therefore, a new classification of errors both in theoretical and applied error analysis can be proposed, which is left to be done by CA and CALL specialists.

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