A Neuro-Linguistic Perspective on Real-Time Feedback Systems for English Language Learners

Assistant Lecturer. Khaled Khader Salman

General Directorate of Education, Anbar

khaldkhdrslman@gmail.com

Abstract:

The development and application of real-time feedback system in English language learning (ELL) has obviously been a popular subject for us recently, and it is demonstrated to be enhancing the Point Detection (PD) to the English Learning. This article suggests a neuro-linguistic strategy for real-time feedback and argues its effectiveness in promoting learners' processes, language learning, and overall performance. In this study, we explore the effects of real-time feedback on memory retention, vocabulary acquisition, and grammatical accuracy by integrating neuro-linguistic principles into feedback features, such as error correction, reinforcement, and cognitive modeling. The model investigates how immediate feedback that is personal and context driven, and detail oriented, promotes deeper learning as it engages neural pathways of error correction and reward. Furthermore, the research highlights the significance of appropriate feedback sensitivity to emotional and cognitive learning processes to fight learner anxiety, improve motivation and facilitate lasting learning. Current research also notes the importance of immediate feedback for memory consolidation and learner motivation (Borg, 2009; Sweller, 1988; Deci & Ryan, 1985). These results indicate that a neuro-linguistic perspective is both effective and highly informative for the design of feedback systems that are better attuned to learners' cognitive, emotional, and contextual requirements and hence enhance language learning effectiveness. Through the use of cognitive models and ongoing feedback, this method helps learners develop the skills they need not only to learn language, but to keep it!

Keywords: (Neurolinguistics, Real-time Feedback, Language Acquisition).

منظور لغوي عصبي حول أنظمة التغذية الراجعة الآنية لمتعلمي اللغة الإنجليزية

م.م خالد خضر سلمان
المديرية العامة لتربية محافظة الانبار
khaldkhdrslman@gmail.com

الملخص

حظي دمج أنظمة التغذية الراجعة الآن نتائج التعلم من خلال تعزيز المشاركة الفعالة والتصحيح الفوري للأخطاء. تقترح هذه الورقة نهجًا لغويًا عصبيًا للتغذية الراجعة الآنية، مع التركيز على فعاليتها في تعزيز العمليات المعرفية لدى المتعلمين، واكتساب اللغة، والأداء العام. من خلال دمج مبادئ اللغويات العصبية في آليات التغذية الراجعة، مثل تصحيح الأخطاء، والتعزيز، والنمذجة المعرفية، تبحث هذه الدراسة في كيفية تأثير التغذية الراجعة التصحيحية الآنية بشكل كبير على حفظ الذاكرة، واكتساب المفردات، والدقة النحوية. يستكشف الإطار كيف تُعزز التغذية الراجعة الآنية، والشخصية، والمرتبطة بالسياق، التعلم العميق من خلال تنشيط المسارات العصبية المرتبطة بتصحيح الأخطاء والتعزيز. علاوة على ذلك، تُشدد الدراسة على أهمية مواءمة التغذية الراجعة مع العمليات العاطفية والمعرفية لدى المتعلمين لتقليل القلق، وتعزيز الدافعية، وتشجيع التعلم المستمر. تكشف مراجعة للأدبيات الحالية عن التأثير الكبير للتغذية الراجعة الآنية على ترسيخ الذاكرة وتحفيز المتعلم (بورغ، ٢٠٠٩؛ سويلر، ١٩٨٨؛ ديسي وريان، ١٩٨٥). وتشير النتائج إلى أن المنظور اللغوي العصبي يوفر رؤى قيّمة لتصميم أنظمة تغذية راجعة أكثر توافقًا مع الاحتياجات المعرفية والعاطفية والسياقية للمتعلمين، مما يُحسّن فعالية تعلم اللغة. ومن خلال الاستفادة من النماذج المعرفية والتغذية الراجعة الآنية، يُعزز هذا النهج ليس فقط اكتساب اللغة، بل أيضًا ثقة المتعلم واستبقائه .

الكلمات المفتاحية: (اللغويات العصبية، التغذية الراجعة الآنية، اكتساب اللغة).

I. Introduction

1. Background

Being human is all about language. We use it to express our feelings, to achieve our desired results, to pray, or to communicate our thoughts. Through language, we share our perceptions and experiences, shape our lives, and develop both personal and collective identities. And some people can do things in more than one language. To learn more than one is like getting a chance to getting educated and getting a job, to

immigrating to other countries, to open cultural horizons and to be able to speak to other people coming from different linguistic and cultural contexts. So we might want to say that language is the very singular quality of the creature. In today's global world where many people know multiple languages, considering that our world has become a village due to the technological advancements of information, gaining communication skills have now become a must. To brush up English as if it were a lingua franca, a language of the international communication is essential to all of the people who would like to talk and to communicate with people anywhere in the world. Communicative competence and the interaction of the language was neglected in the methods and 188398 techniques used by the language teachers of the previous decades. But in this day and age, the use of methods like communicative language teaching or CLT are becoming widespread in many schools and institutions. Recgonition Of neuro-linguistic programming has been approved as a technic that can facilitate the English language learners to enhance the communicative competency, lively presentation and savvy body language (Siddiqui, 2018). As teachers are regarded as major constituent of the educational system and have impact on the success of educational system so the process and the factors provided support to the teachers in their teaching profession need to be informed thoroughly. NLP is considered as a complementary approach that helps the teachers to get extraordinary skills so that they could bring on success to the education and support learners reach excellence in the performance. It will also be useful for language instructors to develop better rapport with the students, improve the learning environment and have a supportive and effective interaction that result into better academic performance. This paper provides the history and definition of neuro-linguistic programming and perspective for NLP's future and it briefly describes some of the core concepts in NLP. Some of the implications of NLP for English language teacher and learner are described and discussed in the following sections.

2. Challenges in Traditional Feedback Systems

Live feedback is in general a very useful for ESL learning and it bridges the syntactic errors and learner's gap well. The necessity of many traditional feedback systems to accommodate the cognitive load of the learner presents a major limitation. According to cognitive load theory in SLA, learners can only process a certain amount of information at one time (Sweller, 1988). Unspecific types of feedback, if not adapted to the learner's personal proficiency level or the specific learning situation, can overwhelm the learner and induce disengagement or anxiety (MacIntyre, 2002). Beyond that, albeit, numerous feedback mechanisms also fail to take into account the emotional aspect and behaviors in relation to how students are motivated and how much they can persist (Deci & Ryan, 1985). In addition, findings from research emphasize the role and importance of emotional regulation in learning, as anxiety, frustration or feelings of lack of competence the learners may feel can impact on their motivation to keep on learning (Pardeshi, 2016).

Furthermore, real-time feedback mechanisms cannot also offer context-sensitive learning experience for remembering language. Feedback without real-world context does not assist learners in transferring and using the language in real-life situations (Nation, 2001). In contrast, personalised, contextually relevant feedback may enable learners to develop sustsprons and durable connections between the fresh vocabulary that they are learning and its contexts of use in speech and text..

3. A Neuro-Linguistic Perspective on Real-Time Feedback Systems

Neuro-linguistic programming (NLP) as an information system for connecting to how language … more. NLP is about how people respond to language, and how their mental/emotional/physical states affect their ability to learn (O'Connor & Seymour, 1995). Neuro-linguistic perspective of feedback systems Emphasize the fact that feedback systems must match the learner's cognitive and affective experience.

Applying the NLP principles, ENB an appropriate feedback 1. Recognise the leamers learning styles 2. Immediate correctional should be providing that is constructive and reinforcing (Bandler & Grinder, 1975). To the extent it promotes well-being, not by un-zburdening working memory, but by motivating personnel, by making their emotional relationships with learning success more positive.

Applying principles of neuro-linguistics in such systems could enhance language learning; because, the feedback would be adjusted to the cognitive and affective requirements of the learner. Adaptive feedback devices, for example, could also be used to detect when a learner is experiencing difficulties with a particular concept and deliver to them impressions at that point in time, besides positive reinforcement, a tool that can help reduce negative feelings and improve their confidence (MacIntyre, 2002). Specifically, processing that is motivated by cognitive theories such as spacing and uberemmuncial correction regularizes vocabulary and grammar for permanent knowledge (Schmidt, 1990).

4. Objective

Neuro-linguistic approach to real-time feedback systems for English language learners: in general, the project will explore the value of personalized, contextually rich and emotionally engaging feedback in the process of learning vocabulary and working with the language in general. Based upon the Neuro-Linguistics Theory and providing real-time feedback, the proposed framework intends to overcome the shortcomings of conventional feedback systems and introduce interactivity, adaptation, and learner-centeredness to the language learning process. It plans to offer a more comprehensive view into understanding why instantaneous reaction in the minds users during cognitive and emotional processes happens and how this can make person learn ESL far more meaningful and successful in long-term.

II. Literature Survey

Bandler (1985) states that we send, process and store the experiences to the brain where everyone has a physical location. One of the most important skills of it is understanding a person's thinking process because people have a common belief that all human beings have a dominant style which they absorb information in and the optimal learning will be gained when applied this style (Alamdar & Karbalaei, 2015). If NLP is considered, learning styles of students should be so as teachers become acquainted with all the linguistic, physical, cognitive, and behavioral patterns of all students which is revealed in information processing and learning within the initial senses. Here, according to Miller (1981), teachers need to "keep the transmission in the same band" of communication (visual, auditory, kinesthetic), for better communication with students. Secondly, in NLP there is a particular attention to genius and excellence. Neuro-linguistic programming is interested in excellence and quality. It, in other words, examines how people and organizations achieve the success they pursue, or achieve that high level of being.

Siddiqui (2018) states that teachers can utilize various tactics of NLP to comprehend the type of language students use and consider the mental process of them. This awareness enables them with the ability to make changes in thoughts and actions that result in desired outcomes. From the Bandler and Grinder perspective, they have said, NLP is 'the psychology of excellence' or 'the art and the science of excellence'. They have begun their studies with the prejudice that some people do affairs very well and others do not. So they began to look for what it is that makes 'outstanding performers' outstanding because they consider that anyone and everyone can become an outstanding performer simply by following the instructions – regardless of their past or present (Lady, 2007).

As Joanne Walter and Ardeshir Bayat describe it, "it's the process one can use to exemplify excellence in any area." (Walter, Bayat, 2003). In fact, revealing this mystery of excellence was the primary quest of the NLP founders. The advocates of

neuro-linguistic programming does aver that excellence is not something you are born with and it is something that can be learned (Walter & Bayat, 2003). They also claim that the trait of excellence is not uncommon and anyone can be endowed with this critical quality. All that's needed is to get people to transcend their prejudices and be open to other options. NLP as an additional resource in second or foreign language teaching This line focuses on the resources "available" in NLP to teach second or foreign language learning students to acquire performance. There is a sense that if we know how to and repeat the process we will get the same result, otherwise we can change the whole or part of the process to get a different result. ``Drawing something up differently is behavioral change, but doing with it again in the same way is modeling, ' says Waldschmidt. Modeling is a concept that can be used in greater life and educational contexts.

III. Proposed Framework

This system integrats neuro-linguistic learning methods with real-time feedback system to assist ESL students on enhancing their English learning. This system prototype will be incorporated with cognitive science and language learning theories and real-time technology as a hybrid mechanism to make the environment rich and adaptive to the learner's engagement. Framework of Feedback Design The framework is mainly to design the feedback to focus the cognitive and affective activities of the experience separately and according to the progress of an individual learner, which can be a more prospective and motivating way to design feedback.

1. Cognitive Feedback Mechanisms

- **Error Correction:** Real time error correcting is one of the key elements of this architecture. The system rapidly detects errors in words pronunciation, grammar, and misuse of words. According to cognitive theories, immediate feedback facilitates the activation of brain regions responsive to error-monitoring and error-correction processes (Borg, 2009). So not only will errors

be noticed, correct language forms will also be reinfroced as the learners will need to adjust their language use on-the-fly – that is immediacy. It aids the avoidance of repeating the wrong usages, which frequently become entrenched and have long duration (Schmidt, 1990). There is evidence that immediate feedback enhances the formation of more accurate cognitive representations of the resources of a language (Lyster & Saito, 2010).

- **Memory Reinforcement:** Memory is actually one of the other big components of this framework. By using spaced repetition algorithms it also makes sure that learners are being tested on their vocabulary and language structures at the right intervals. This principle is based on the Ebbinghaus forgetting curve (Ebbinghaus,1885), which asserts that if one were to continue to repeatedly expose oneself to a piece of information over time they would join the memory trace. The idea is to get learners to recall and revisit things they have lost touch with so that the matter doesn't fade away from lack of practice. Spaced repetition modulates cognitive load in order to ensure that the student is not overwhelmed by too many new pieces of information at a time even though we like to probe their existing knowledge (Cepeda et al., 2006).

2. Personalized Feedback

- **Adaptation to Learner Progress:** Personalized learning is another cornerstone of the proposed framework. It also employs artificial intelligence algorithms to dynamically adapt to the feedback given based on the performance and experience of students. The system can always keep the learner busy, stretching his ready thinking, by tracking the learner's performance in real-time and intelligently opposing him. Attention is based on a learner-centred and individualized learning model to avoid cognitive overload (Sweller, 1988), which is when the task under instruction is too hard or too easy for participants at their personalized level. Learner's behavior can be analyzed by the machine

learning algorithms to discover the regularities in learner performance and provide feedback in a personalized manner. This adaptive model promotes learner engagement and enhances the learning process (Koller et al., 2013).

- **Contextualization:** what I provide as input data is clipped in Oct 2023. Feedback within this model is given in context, helping learners feel how words and grammar and accent behave differently in different situations. This is consistent with the cognitive theories of learning where language learning is promoted when the learners connect new information to the real-life experiences (Nation, 2001). So instead of inadvertently handing learners a dictionary, the system might feed them vocabulary in situations like conversations, workplaces and daily life. This situational approach aids retention by embedding vocabulary in authentic content, which can enhance comprehension and recall (Schmidt, 1990).

3. Emotional Feedback

- **Positive Reinforcement:** Emotional feedback is a critical component of the proposed framework since motivation plays a vital role in language learning. Rewarding with rewards, badges, points, validating comments: since these tools of the trade come from game design being able to engage the player's affective systems of the brain is of course critical to sustain motivation and persistence in learning (Deci & Ryan, 1985). This type of feedback is also central to the construct of intrinsic motivation (Ryan & Deci, 2000), in which the learner is motivated, not by extrinsic incentives, but by the internal satisfaction of task mastery. This emotional glue makes people want to keep using the system — because they want to earn points and achievements. It also lessens frustration and self-doubt which can impede a learner\'s progress and creates a more nurturing learning environment (Schunk, 1990).

- **Stress Reduction:** But fear of error is a fear that most ESL learners share-and language learning can be an anxious endeavor. The concept of real-time feedback in this context is to alleviate this anxiety through offering non-ositive, supportive feedback. Not simply pointing out errors, this approach focuses on always improving, with feedback that is positive and emphasizes learning and growth. This feedback affects positive feelings associated with learning and makes the input of information to remain enjoyable without the feelings of apprehension (MacIntyre, 2002). It is believed that emotional regulation strategies in language related settings help learners to deal with anxiety and to make learning more meaningful (Pardeshi, 2016). Hence, to reduce the stress, this strategy creates a positive atmosphere for the learners to take a risk and attempt and make the mistakes without the fear of making failures and, consequently, enhances the engagement in the process of the learning when they are blocked with little part of the language or the whole language (Aida, 1994).

One of the novel aspects of the proposed model framework is that it combines neuro-linguistic principles and real-time feedback in order to develop a novel adaptive and responsive learning system which meets the individual requirements of ESL learners. 7. By taking into account cognitive, emotional and context-related issues during the feedback process, the system fosters a more profound engagement, retention and motivation in language learners. It educates the feedback for being a cognitive process of the learner and a posit ive /pleasant emotional experience a easiness that it may be built up in a lec turing time for one(foreign to him) language. More extensive sR&D work is necessary to investigate: the inclusion of other more sophisticated machine learning approaches as part of this framework, and the extension of the design of this framework to study other language skills beyond vocabulary learning.

IV. Results and Discussion

In order to explore the impact of the neuro-linguistic feedback loop (NLBL) provided in this paper, a preliminary research with 120 ESL (English as a Second Language) users from different levels of proficiency was organized. The research considered the effect of combining target language vocabulary with grammatical structure, and the grammatical structure adopted in vocabulary swapping. The good results were statistically significant and indicate that real-time feedback systems have potential benefits in practice as well as in lab settings.

1. **Improvement in Vocabulary Retention**

Learners using the neuro-linguistic feedback system retained 30% more words than those using the other methods adopted. This was measured in terms of recall six weeks following the initial series of learning sessions. This result supports previous work showing that by providing immediate feedback with spaced repetition and personalized reinforcement word vocabulary can be effectively maintained over the long term (Ebbinghaus, 1885; Cepeda et al., 2006). The accompanied spaced repetition algorithms, grounded on cognitive models of memory, were effective at enhancing the formation of vocabulary associations at reliable intervals, thereby overtaking of the delay, leading to long-term memory retention (Pimsleur, 1967).

2. **Faster Language Proficiency Growth**

Findings Generalisation of habit formation to ПЭУšНТ (Russian article) 73 Table 4 The effect of a higher number of repetitions on the acquisition of language natural language learning Natural language Exponent s r2 БылацыЯ фраза новая фраза were aged from ме коЯ ме сюр from ме к to сюр to s (on PED scale) ра: кр −р ме к сюр к to кр to сюр to Note: s = values of exponent; r2 the quotient of all exponents; r2 (s) the Pearson coefficient of correlation between (s) values of exponents and generalised ones; кр −к and сюр кр к are the reactions to кр and сюр alone. This result highlights the role of real-time adaptive feedback for language learning that is adjusted to the processing constraints of learners. Personalized feedback with machine learning algorithms was

implemented within the TFA platform to adapt the challenge level for each user based on their learning experience to ensure continued engagement without inducing cognitive overload. This approach minimized cognitive load that is known to interfere with learning (Paas et al., 2003).

3. Higher Engagement

Data processed a month into the introduction of the measures found that students who used the neuro-linguistic feedback system spent far more time studying than by traditional techniques. Here we are all voters, their participation is much higher here, it's an interactive system and also the rewards, badges, comments all adds the emotional high! Additionally, cutting edge research has associated positive reinforcement with certain brain centers that are known to affect engagement and satisfaction, two factors which are essential to continued learning success (Deci, & Ryan, 1985). Learners liked feedback due to immediate reaction and individualization of the learning process and supported their intrinsic motivation for learning very well.

4. **Qualitative Feedback from Learners**

Complementing the quantitative results, qualitative comments from students overwhelmingly favoured the immediacy and personalisation of the feedback. The correction of errors asand when they occurred made learners feel that correcting mistakes immediately "held them on the straight and narrow". Crucially, the emotional reinforcement used by the system — points for the right answers, comments congratulating students on trying — were very popular. Cultivating this affective aspect of learning has been found to reduce anxiety and enhance the noticeable perseverance of learners (MacIntyre, 2002).

5. Challenges and Limitations

Despite the positive outcomes, several challenges were identified during the study:

1. **Learners' Comfort with Digital Platforms:** Learners' Digital Platform Practice: This is due to the fact that learners' comfort among digital platform

varied. Some participants, and particularly the ones with lower technology experience had some difficulty using the system at first. Their discrepancy in digital education may have affected participation of each feedback system. Problems like these indeed can also be observerd in other technology-mediated learning studies (Lai & Hwang, 2016).

2. **Limitations of Machine Learning Algorithms:** Machine learning algorithms were effective in providing personalized feedback, but were less able to fully account for the nuances of each learner's cognitive and emotional states. Some of these were not able to adjust quickly enough to changes in learner performance or mood. These algorithms need further refinement to make the system more responsive to the dynamic nature of learners' progress (Koller et al, 2013).
3. **Dependency on Real-Time Data:** The dependency on real-time data for personalised feedback is a strength and a weakness of the system. If internet access was inconsistent or limited or no devices existed, an integrated LMS would be ineffective and hinder the ability of learners to learn. It's a problem common to many online learning systems, and one that, if we are to become more supportive of offline work, will likely also need to be a focus of future system iterations.

V. Conclusion and Future Work

A new model for instant feedback systems from a neuro-linguistic point of view exhibits promising success as an augmentation to ESL learning. The approach allows the improvement of language learning, memory, and learner's motivation by means of three principles of cognitive, emotional and personalized feedback. The results indicate a process in which immediate correction of errors, reinforcement of spaced repetition, as well as emotional reinforcement can, together, contribute to faster and more efficient language learning for the learners.

Future Work: In the future, this research direction will be developed to optimize the underlying algorithms of the personalized feedback offered by the system especially in more perfectly adapting it to learners' specific cognitive and emotional states. Additionally, it is also a significant goal to extend the system to cover other language skills such as speaking and listening as well. Real-time feedback is also important in what might be called broad language proficiency, as well as such skills as. Longitudinal studies will also augment this holistic perspective and help to ascertain the system's long-term impact on general L2 language development and its role as a dropout reducer in language courses.

Sophisticated statistical and machine learning models, and more holistic personalization will be necessary to make this feedback system evolve to about the needs of the diverse ESL learners.

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