

## **Using Personalized Learning for Developing Primary School Pupils' English Morphological Skills**

**Dr. Hager Gamal Ahmed Labib al-Tonsi**

Assistant professor of Curriculum and Methods of Teaching English,  
Faculty of Education, Helwan University, Egypt

### **Abstract**

The current research investigated the effect of a program based on personalized learning in developing primary school pupils' English morphological skills. Participants were 50 fourth year primary school pupils from a public school in Egypt. They were randomly selected and divided into a control group and an experimental group. The research depended on the quasi experimental pre -post design. The groups were pretested and post tested on the EFL morphology test, designed by the researcher, before and after the administration of the suggested program. Statistical analysis of the data obtained from the pupils' test scores revealed that the experimental group outperformed the control one in the post administration of the EFL morphology test. The suggested program based on personalized learning had a large effect size ( $d=7.0$  ), and developed primary school pupils' EFL morphological skills. It was recommended that personalized learning profile, personal learning paths, and flexible learning environments were effective PL strategies in developing English morphological skills.

**Keywords:** personalized learning, morphological skills, primary school pupils, EFL

## استخدام التعلم المخصص لتنمية مهارات الصرف في اللغة الانجليزية لدى تلاميذ

### المرحلة الابتدائية

د.هاجر جمال أحمد لبيب التونسي

أستاذ مساعد المناهج و طرق التدريس (تخصص اللغة الإنجليزية)، كلية التربية، جامعة حلوان

### المستخلص

حاول البحث الحالي تحديد فاعلية برنامج قائم على التعلم المخصص في تنمية مهارات الصرف في اللغة الانجليزية لدى تلاميذ المرحلة الابتدائية. شارك في البحث 50 تلميذ في الصف الرابع الابتدائي باحدى المدارس الحكوميه في مصر، تم تقسيمهم الى مجموعتين تجريبيه و ضابطه. اعتمد البحث على التصميم شبه التجريبي القبلي البعدى. تم تقديم اختبار مهارات الصرف قبل و بعد تقديم البرنامج المقترح القائم على التعلم المخصص، من اعداد الباحثه. اوضحت نتائج التحليل الاحصائى لدرجات التلاميذ فى اختبار مهارات الصرف فى اللغة الانجليزية تفوق طلاب المجموعه التجريبيه على أقرانهم فى المجموعه الضابطه و ذلك فى التطبيق البعدى للاختبار . كما كان للبرنامج المقترح حجم أثر كبير ( $d=7.0$ ) مما ساهم فى تنمية مهارات الصرف فى اللغة الانجليزية لدى تلاميذ المرحلة الابتدائية.

**الكلمات المفتاحية:** التعلم المخصص، مهارات الصرف، طلاب المرحلة الابتدائية، اللغة

الانجليزية كلغه أجنبيه

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### **Introduction**

Morphology, a field of linguistics, refers to the study of internal structures of words, word formation processes, and word meaning (Badawi, 2019; Carlisle et al., 2013; Zhang & Zou, 2020). Morphology is a branch of grammar that focuses on word structure and relations between words, so vocabulary is part of morphology (Aziz et al., 2019). Morphology studies how words are produced from morphemes (Kurdi, 2016). Morphemes are the smallest units of language (Lau et al., 2017). Morphemes are either free or bound; A free morpheme can be a meaningful single word, while a bound morpheme is added to a word (Rodman & Hyams, 2011). Free morphemes are made up of affixes, whereas bound morphemes are made up of content and function words. Content words are nouns, verbs, adjectives, and adverbs, while function words are prepositions, articles, conjunctions, and pronouns (Giyatmi, 2019).

Morphology means manipulating word structure which improves students' reading comprehension (Ke et al., 2021). Morphology helps students identify words accurately to develop their vocabulary knowledge (Kieffer & Lesaux, 2012). EFL vocabulary development leads to language proficiency and accuracy (Wahid & Farooq, 2019). Applying morphological rules improves students' linguistic competence (Giyatmi, 2019). Developing students' skills of word forming helps them in deriving different words from the same word, consequently they can guess the meaning of unfamiliar words (Farghal & Jaber, 2017). Constructing new words through combining morphemes is a strategy used in vocabulary teaching (Asaad et al., 2022). Morphological instruction is essential for vocabulary learning and reading comprehension (Lo & Bunch-Crump, 2017).

Personalized learning (PL) has various definitions and ways of application. It is an umbrella for educational strategies that focuses on each student's abilities, knowledge, and learning needs (Schmid & Petko, 2019). Personalized learning is a teaching -learning approach that

customizes each student's engagement, learning process, and learning demonstration (Bulger, 2016; Dishon, 2017). Personalization means that instruction is paced to each student's needs, preferences, and interests (Bray & McClaskey, 2013). Personalized learning is tailoring learning according to students' interests, strengths, and needs. It supports students' learning through flexible instructional procedures (Patrick et al., 2013).

PL develops students' EFL vocabulary and sentence comprehension skills. It enhances students' interest in learning English and reduces their learning anxiety (Wu & Huang, 2016). Personalized learning encourages teachers to use the appropriate learning materials to a student at the right time (Chen et al., 2018). Personalized learning increases students' motivation, satisfaction, and engagement (Falcão et al., 2018). Personalizing the learning content aims to achieve better learning for each student (Bacon & Gaither, 2020). PL delivers the learning responsibility to students by tailoring the learning experiences to their personal needs, skills, and interests (Stacey & Benson, 2014). Applying PL encourages teachers to be flexible. They offer students different tools to use in their personal learning paths. Students are motivated to enhance their language skills (Grant & Basye, 2014).

Due to the importance of morphology for language skills, attention is needed in EFL classrooms for teaching English morphology (Apel, 2014). Morphology instruction focuses on applying different word formation rules depending on morphemes (Arviyolla & Dahnilsyah, 2022). Word-formation rules develop students' word recognition, vocabulary, spelling, grammar reading, and writing (Masrai, 2016). Identifying different morphological relationships encourages students to use different word forms and vocabulary choices during writing (Nagy et al., 2014). There is lack of vocabulary knowledge among EFL learners which hinders their communication (Shaath, 2017).

Morphology instruction should be explicitly introduced in EFL classrooms. Students identify different word parts and use them in various contexts. Thus, morphology instruction develops students' word-meaning knowledge. Morphological skills are used to memorize words systematically (Zhang & Zou, 2020). The most common PL strategies are diversity and readability. Diversity strategy means offering diverse learning tasks to the learner that targets different aspects of word formation (Zou, 2017). Readability strategy focuses on self-paced

vocabulary learning. Teachers offer readable contexts to students to elicit learning motivation (Xie et al.,2019).

### **Context of the Problem**

Morphology instruction should be included in language literacy programs for young learners (McLeod & Apel, 2015). Morphology should be taught explicitly in EFL classrooms to develop students' different language skills (Chen, 2022; Wahid & Farooq, 2019). Morphology skills are included in the Scope and Sequence of Connect4, the English textbook introduced to primary 4 pupils in public schools in Egypt. Connect 4 is based on language skills integration and using language in real-life situations (Dutton, 2022). EFL teachers in Egypt neglect developing students' morphological skills by excluding the language form instruction from the EFL classrooms (Badawi,2019). In Egypt, EFL students' weakness of morphological awareness results in reading comprehension weakness (Seleem et al.,2023).

The increasing availability of different e-learning platforms in Egypt enhances the integration of personalized learning in classrooms. They support individualized learning paths, offer flexible learning opportunities, elicit collaboration, and foster students' lifelong learning (Khalaf,2022). The Ministry of Education in Egypt offer interactive activities for each lesson in Connect4, available on the official website of the Ministry <https://moe.gov.eg/ar/elearningenterypage/e-learning/> and [www.ekb.eg](http://www.ekb.eg) include online exercises but teachers do not integrate them in the EFL sessions.

Few studies have investigated EFL morphology (Sonbul & El-Dakhs, 2021). Students in Egypt face difficulties in EFL morphology (StudyCorgi., 2023). In October 2022, the researcher developed and administered The EFL Morphological Test to 25 primary school pupils in a public school in Egypt. Results showed that 65 % of the pupils could not pass the test.

### **Statement of the Problem**

The problem can be stated as follows: primary school pupils in Egypt had poor EFL morphological skills.

### **Research Purpose**

This research aimed to examine the effectiveness of personalized learning in developing fourth year primary school pupils' EFL morphological skills.

### **Research Questions**

- What are the EFL morphological skills suitable for fourth year primary school pupils?
- What are the features of a suggested program based on personalized learning to develop fourth year primary school pupils' EFL morphological skills?
- What is the effectiveness of the suggested program in developing fourth year primary school pupils' EFL morphological skills?

### **Research Significance**

- Developing fourth year primary school pupils' EFL morphological skills.
- Offering a program for integrating morphological skills in EFL sessions.
- Paving the way for future research on EFL morphological skills and personalized learning according to the findings of the research.

### **Research Delimitations**

- Participants were delimited to fourth year primary school pupils at a public school in Egypt.
- The first term of the academic year 2022/2023, from October 4 to November 24, 2022.
- The following EFL morphological skills: Identifying morphemes in words, segmenting words into morphemes, differentiating between affixes and base words, using correct inflectional morphemes, and using appropriate derivational morphemes.

### **Research Terms**

#### **Personalized Learning (PL)**

PL is an approach that focuses on students' diverse needs through tailoring instruction, assessment, and content (Marzano et al., 2017). In the present research, personalized learning referred to the use of PL profiles, personal learning pathways, and flexible learning environments to develop fourth year primary school pupils' EFL morphological skills.

### **Morphological skills**

Morphological skills are the skills of manipulating different word forms (Sukyng,2020). In this research, morphological skills refer to the skills developed among fourth year primary school students by the Personalized Learning based suggested program. These skills were identifying morphemes in words, segmenting words into morphemes, differentiating between affixes and base words, using correct inflectional morphemes, and using appropriate derivational morphemes.

### **Review of Literature and Related Studies**

Morphological awareness is the identification and manipulation of morphemes or word structures to make new word meanings (Aziz et al., 2019). Morphological awareness depends on analytic and synthetic aspects. Analytic morphology focuses on breaking words into morphemes, while synthetic morphology focuses on derivations and word formation (Asaad et al.,2022). Morphological awareness facilitates students' understanding and retrieving of English vocabularies that include different morphemes (Jiang & Kuo,2019).

Morphological awareness facilitates morphological decoding, consequently students' word reading and reading comprehension are improved (Levesque et al.,2017; Tighe et al., 2018). The metalinguistic development depends on increasing complexity. It starts with phonology, orthography, and morphology followed by more advanced language levels: semantics, syntax, pragmatics, and discourse(Mohammed, 2021).

Morphological awareness improves students' vocabulary, reading comprehension, writing skills, and speech production (Akbulut, 2017; Ebedym,2020; Oz,2014). Morphological awareness refers to the skills of analyzing, manipulating, and interpreting different word structures. Such skills are used to interpret complex words in a text and students' reading performances are improved (Zakiyah& Akhiriyah, 2023). Amirjalili& Jabbari(2018) investigated the effect of morphological instruction on intermediate EFL learners' reading comprehension. The participants were 129 university students in an Iranian university. The pretest-posttest quasi-experimental control group design was used. Results revealed that the experimental group outperformed the control one on the reading comprehension test.

Morphology divides words into three categories: prefixes, suffixes, and root/ stem. The stem or root is an independent morpheme that cannot be removed. Prefixes are morphemes that come before a stem, while suffixes are morphemes that appear following the stem. Prefixes change the word meaning without changing its grammatical function. Suffixes change the meaning and grammatical function of the word (Zakiyah& Akhriyah, 2023). Al-Haydan(2020) examined the effect of morphological awareness instruction on reading comprehension skills. Participants were 58 Saudi female secondary school students, divided into a control group and an experimental group. The experimental group was taught using a morphemic analysis strategy during their reading classes, whereas the control group attended the usual classes. The experimental group excelled the control one on the reading comprehension post test. It was concluded that direct instruction of prefixes, suffixes, and base words developed students' reading comprehension.

There are three types of morphology: inflectional, derivational, and compounding. The (s) added to verbs with third-person singular pronouns is an example of inflectional morphology. Affixes, prefixes, and suffixes are examples of derivational morphology. Compounding morphology means forming a word by combining two or more words, like firefighter (Zhang & Zou, 2020). Inflectional morphology develops students' grammatical competency, while derivational morphology develops students' vocabulary knowledge. Grammatical competency and vocabulary knowledge are critical for students' writing (Oz, 2014).

Chen (2022) investigated the relationship between morphological instruction and vocabulary growth of Chinese ESL students of English. Participants were 76 first year university students at a Chinese university. They received an 18-week morphology instruction intervention that focused on derivation, inflection, and compounding. Results of students' answers on the vocabulary test indicated that explicit morphological instruction increased students' vocabulary size.

The English morphemes are acquired according to complexity: Inflectional morphemes are less complex than derivational morphemes. Inflectional morphology is acquired early due to the regular word structures in inflected words, such as works, working, and worked. Inflectional morphemes do not affect the meaning of words after

modifications and there is no phonological shifting in the base of the inflected word. In contrast, derivational morphology is acquired late due to the large number of derivational morphemes in English. Derivational morphemes change meaning, grammatical category, phonology, and orthography of words attached to them. Compound words are used to fill semantic gaps; speakers might use the term "run-man" rather than "runner" to describe someone who runs (Varatharajoo, 2016; Zhang & Koda, 2013). Thus, it is recommended that morphology instruction be introduced to middle school students since the textbooks focus on academic language (Goodwin et al., 2017).

Asaad et al. (2022) investigated the effect of derivational morphology instruction on productive vocabulary breadth. Participants were 30 postgraduate students in Malaysia who received an EFL morphological awareness intervention for 11 sessions. Then, they answered the Productive Vocabulary Level Test (PVLTL). Data analysis of students' test results revealed that the morphological awareness intervention was effective and beneficial in increasing the students' productive vocabulary breadth.

Morphological skills include identifying the meaning of complex words and creating new words using morpheme inflections and derivations (Arviyolla & Dahnilyah, 2022). Morpheme identification, morpheme meaning, morpheme discrimination, morpheme forming, pseudoword inferencing, real word inferencing, decomposing morphologically complex structure are the common morphological skills to be developed in English sessions (Zhang & Zou, 2020). Identifying the morphological components of words, manipulating the morphological components, decomposing the morphological components, morpheme production, morpheme counting, and morpheme manipulation are the morphological skills to be targeted in EFL classrooms in Egypt (Soliman et al., 2023).

Wahid and Farooq (2019) investigated the effect of derivational and inflectional morphological awareness on EFL writing. Participants were 200 advanced undergraduate Saudi EFL university students divided into a control group and an experimental one. Results showed that the experimental group outperformed the control one on the Writing Test. It was recommended that morphological instruction be introduced to EFL students in early education stages.

Morphology instruction targets both sub-lexical and supra-lexical levels. sub-lexical level focuses on vocabulary, spelling, and word reading, while supra-lexical level focuses on writing and reading comprehension (Brimo, 2016). Word recognition, meaning inferencing, and segmentation are morphological skills that are not automatically developed (Schano, 2015). Learning vocabulary is based on the understanding of word forms (Arviyolla & Dahnilyah, 2022). Ebedy(2020) investigated the effectiveness of using a morphological awareness training program in developing university students' lexical richness. Participants were 60 first-year English majors enrolled in a university in Egypt, divided into a control group and an experimental one. Results showed the positive effect of morphological awareness instruction on developing the participants' EFL lexical richness.

It is recommended that morphemic analysis be used as a reading strategy. The strategy enables students to infer the meaning and pronunciation of different words by decomposing them into meaningful parts: prefixes, suffixes, and roots. Students can read words and increase their vocabulary knowledge as well as reading accuracy (Antonacci & O'Callaghan, 2011; Al-Haydan,2020). Alsaeedi (2017) explored the effect of morphological awareness intervention on receptive vocabulary and morphological awareness. Participants were 60 EFL Saudi university students divided into a control group and an experimental one. The intervention lasted for 6 weeks where the experimental group received analytical word formation rules, while the control group received regular instruction in the English session. The results of students on The New Vocabulary Level Test and the Morpheme Identification Test demonstrated that morphological awareness intervention developed the experimental group students' EFL morphological awareness and receptive vocabulary.

The Verbal Efficiency Theory (VET) introduced by Charles A. Perfetti in 1985 maintains that reading skills development depends on students' accurate and automatic word recognition. Automatic word-recognition is the result of orthographic-to-phonological mapping. Word repetition facilitates word retrieval. The vocabulary/print exposure is stored in working memory. The mental representation of the word depends on word structure and word meaning. Reading depends on word decoding abilities, sentence structure understanding, background

knowledge, and vocabulary knowledge (Hamilton et al., 2013; Raudszus et al.,2018).

Form-focused instruction, like morphology instruction, helps students identify different word formation rules in EFL classroom. Teaching morphology increases students' interests in learning English words. Word-formation rules help students increase their vocabulary autonomously (Chen, 2022). Introducing morphological instruction in preschool improves students' reading comprehension in the sixth grade(Lyster et al.,2016). Teaching English morphological skills in EFL classrooms in Egypt helps improve students' vocabulary, spelling quality, reading comprehension, and writing performance (Badawi,2019).

Different tasks are used in measuring different morphological skills. In morpheme discrimination tasks, students are asked to determine the morpheme that has different meaning, for instance the morpheme(mate) has different meaning in estimate compared to the same morpheme in classmate and roommate. In morpheme form tasks, students are asked to match suffixes and prefixes to their appropriate roots. In morpheme meaning tasks, students are asked to select the correct meaning of some suffixes and affixes. The morpheme inferencing tasks depend on a context and students guess the correct lexical item from distractors (Zhang & Zou,2020).The morphological test usually include production and decomposition tasks introduced orally and written to decrease the load of working memory and elicit the visual detection of the word roots. The test should start with practice items to alleviate students' anxiety (Hamavandi et al.,2017).

Mohammed (2021) investigated the effect of explicit word-formation processes theory on EFL morphological awareness and vocabulary. Participants were 40 university Saudi students in the first level of English. Students' answers on The New Vocabulary Level Test (NVLT) and the Morphological Awareness Test (MAT) revealed that explicit word-formation instruction raised students' morphological awareness and improved their vocabulary knowledge.

McNeill and Everatt (2013) developed The Generative and Receptive Morphological Test. In the generative section of the morphological test, students are asked to change the word formation of a given stimulus to complete the sentence. In the receptive section of the morphological test, students are asked to distinguish if the two given words are from the same family or not. Each section consists of 30 items to be answered in 15

minutes. Both tasks include practice items to show the participants how to answer the test items.

El-Bassuony et al.(2020) investigated the effect of a Personalized Learning (PL) model on EFL reading skills. Participants were 57 preparatory school students, in a public school in Egypt, divided into a control group and another experimental one. The experimental group outperformed the control one on the post administration of the intensive English reading skills in favor of the experimental group. The PL model implemented in the study consisted of five zones: a Discussion and Thinking Zone where the whole class discussion was held. A Discovery Zone where students solved problems and worked on projects. A Show-Off Zone where students presented and shared their works. A Repeat Zone where students asked for help, advice, and explanation. Finally, there was a Creation Zone for students to edit and refine their presentation.

Personalized learning (PL) means modifying the pace of learning for each student's needs. Hence, the learning objectives, content, and activities vary to satisfy individual's needs and interests (Department of Education Office of Educational Technology, 2016). Personalized learning is differentiating instruction for every student. Students control their learning and the teacher offers immediate feedback (Shemshack & Spector,2020). PL is adapting content according to a student's choice and pace. PL depends on a student's prior knowledge preferences and learning style (George & Lal, 2019).

PL is a learner-centered instructional approach that focuses on offering personalized guidance for each student in the learning process. It depends on specific strategies and principles (Al-Atabi 2018; Rad et al., 2018). PL is an instructional approach that provides different learning choices and tailors the learning contents and materials to satisfy each student's learning needs, interests, and goals (Alamri et al.,2020). PL replaces the one-size-fits-all instructional model with an engaging model that meets students' needs, goals, and interests (Redding, 2014). To sum up, the definitions of personalized learning vary depending on the adopted framework. The common theme is that PL is a student-centered approach that offers flexible learning (DeMonte, 2019).

PL depends on these strategies: PL profiles, personal learning paths, and flexible learning environment. Learner profiles are records of each student interests, strengths, weaknesses, skills, progress, and learning goals (Marzano et al., 2017; O’Leary, 2022 ;State Department of Education, 2019). Data in learner profiles highlight each learner’s unique needs (Azukas, 2019; Symonds et al., 2020). The student cooperates with the teacher in defining specific learning goals and monitoring their achievements. The learning profile includes data from multiple sources, like projects, tests, quizzes, and presentations. The learner profile is an updated record of each learner’s interests, attitudes, past experiences, and performance. Teachers update students’ profiles: strengths, weaknesses, interests, and goals (Bill &Melinda Gates Foundation, 2014; Bingham et al., 2018; Hamilton et al., 2014). Learner profiles offer documentation of a learner academic goals, learning progress, areas of strength and weakness, goals, and passions (McCarthy et al., 2020; State Department of Education, 2019). They offer various in-depth data about each learner (Liu et al., 2020).

Personal learning paths mean enriching students’ different learning choices, using different learning strategies, offering individual support to facilitate the grade level content, whether remedial or enrichment. This means that the activities and interactions offered to students match the learner and learning goal (Pane et al., 2015; Shemshack et al.,2021). Teachers customize students’ learning paths according to students’ progress, needs, motivations, and goals. Teachers monitor students’ learning progress through continuous assessment of the learning goals (Bill & Melinda Gates Foundation, 2014; Bingham et al., 2018; Hamilton et al., 2014).

Learning pathways are logical plans designed by the teacher and students to achieve academic learning outcomes (State Department of Education, 2019). Learning pathways allow students to co-design their learning to identify learning objectives and standards (Laux, 2018; Pane, 2017). Teachers design learning activities using various ways of learning engagement and learning demonstration (France, 2020; Liu et al., 2020; McClaskey, 2018). Personalized learning plans depend on focus groups and interviews to adjust the learning experiences. Students learn at their own pace (Shemshack & Spector 2020)

Flexible learning environments refer to using flexible timing, grouping strategies, and different technological tools to offer personalized

learning paths (Pane et al., 2015; Shemshack et al., 2021). Teachers offer flexible learning environments according to students' needs and their learning levels (Bill & Melinda Gates Foundation, 2014; Hamilton et al., 2014; Bingham et al., 2018). Flexible learning environments offer various learning opportunities for students to meet their needs and goals (State Department of Education, 2019).

Learning environments provide meaningful choices according to student interests. PL offers a supportive learning environment to achieve autonomous learning growth (Azukas, 2019). A Personalized Learning environment enhances collaboration between teachers and students. Teachers redesign classrooms through flexible seating (France, 2020; State Department of Education, 2019). Personalized learning environment respects student academic and emotional growth (Marzano et al., 2017; Zhang et al., 2020). Students are related to their peers which develops their belonging to the learning environment (Schumacher & Ifenthaler, 2018).

Based on PL, each student progresses at his own pace regardless of the average (Rose, 2016). PL measures students' academic growth based on individualized assessments. Personalization focuses on each individual student's academic growth which is not compared to a hypothetical average (Basham et al., 2016). According to PL, every student is unique and learns in a different way (Johnson, 2004). PL aims to solve students' disengagement and achievement problems. Learning motivation is achieved by engaging goal-setting and decision-making processes (Hughey, 2020). Personalized learning targets meeting students' needs flexibly (Pratt & Kovatcheva, 2018).

Universal design for learning, the framework of PL, focuses on integrating different ways of information representation, means of engagement, and expression of understanding (Basham et al., 2016). Being a learner-centered approach, PL addresses students' unique characteristics (Lee et al., 2018). PL can be applied in traditional face to face as well as technology enhanced learning environments (Nandigam et al., 2015). Personalized learning paths can be easily introduced when collecting data using online technologies. It is difficult to monitor the learning pace of every student in a traditional learning environment (Vassiliou & McAleese, 2014).

Integrating technology in PL modifies teaching strategies to monitor students' individual performance and personal development (Peng et al., 2019). Teachers can adapt the technological tools to satisfy each student's experiences, interests, and needs (Spector, 2018). The wide spread of digital content facilitates the application of PL in recent years (Tang et al.,2019). Technology can enrich the PL application as it provides unique learning experiences according to the features of different learning environments. There is not a unified agreement on the technological components to be integrated in the PL approach (Shemshack et al.,2021).

Al-Atabi (2018) examined the effect of using different personalization techniques on EFL oral performance for preparatory school students in Iraq. Participants were first year preparatory students in a school in Iraq. They were divided into a control group and another experimental one. Personalization techniques included story books, puppets, projects, and different games, like make me say yes, do you have..? can you...? The results of the speaking post-test revealed that the experimental group excelled the control one on the post administration of the speaking test.

A personalized e-learning course targets supporting student's personalization of assignments through providing personalized resources. Teachers offer individual scaffolding and interactions with students. They provide learning choices to meet students' learning preferences, needs, and interests. Feedback is personalized through individualized evaluation. Students select their learning pathways through setting their learning goals. They are offered online discussion boards to support intrinsic motivation, engagement, autonomy, competence, and relatedness (Zhou et al.,2022).

Alamri et al. (2020 ) examined the effect of PL activities on students' learning satisfaction and intrinsic motivation in an online course. The course depended on customized curricula to address the participants' needs and interests. The PL activities focused on personal learning choices, learner control, and personalized evaluation. Participants revealed that the PL interventions was effective in meeting students' learning needs and interests. Integrating PL principles in online courses developed students' learning satisfaction and intrinsic motivation.

PL principles are locus of control, knowing students as learners, student engagement, collaboration, effective use of ICT, and classroom

culture. Locus of control means that the learning process is student-centered. Students participate in planning the learning activities and the instructions. Knowing students as learners means identifying each student interests, needs, and learning progress. Student engagement refers to students control of their learning directions which develop their self-esteem. Collaboration refers to students' cooperation with the teacher to design the learning path. Effective use of ICT extends the learning resources by offering different sources of information. ICT facilitates knowledge access . Classroom culture refers to the flexible learning environment for PL ( Williams , 2013).

PL focuses on autonomy, competence, and relatedness. Autonomy means that students are responsible for their learning behavior and decisions. Competence is a student's personal capabilities in the learning environment. Relatedness means connecting to others as well as feeling belongingness to the community (Deci & Ryan, 2002; Marzano et al., 2017). Student learning reflection increases the sense of learning ownership and empowers them to track success and adjust their performance (DeMink-Carthew, 2017). Students select tasks and activities to achieve learning goals (Laux, 2018; Sergis et al., 2017).

The major obstacle of applying PL is the lack of understanding of how to design a PL program suitable for all students (Patrick et al., 2013). Teachers find it easier to offer one type of assignment than to design multiple forms of understanding (Basham et al., 2016). The unfair teacher-student ratios cause teachers' overload while designing personalized learning experiences (Lee et al., 2018). It is difficult for teachers to design instruction that targets competency, autonomy, and relatedness with insufficient student data (Aliusta & Özer, 2017; O'Leary, 2022). Zhou et al. (2022) designed a personalized learning intervention for middle school students. Participants were 152 seven graders divided into a control group and another experimental group. The experimental group students were divided into high, medium, and low level according to their knowledge level. Results showed that individualized learning intervention affected the experimental group students' learning and attitudes towards learning with different knowledge levels.

Connect 4 supports the development of essential life skills within four dimensions of learning developed by the UNICEF for the MENA region, and adopted by the English language curriculum framework: Learning to

know, Learning to do, Learning to live together, and Learning to be. *Learning to know* focuses on creativity, critical thinking, and problem solving through offering learners guided opportunities to research, collect, and combine information to build their own knowledge. *Learning to do* focuses on productivity, negotiation, decision-making, and collaboration through offering learners' opportunities to plan, carry out, produce, and assess their work. *Learning to live together* focuses on participation, empathy, and respect for diversity. Finally, *Learning to be* focuses on self-management, communication, resilience, and accountability through encouraging students to work effectively and respectfully with others, and to learn from their mistakes (Dutton, 2022).

These four dimensions are aligned with the three main strategies of Personalized Learning: PL profiles, personal learning paths, and flexible learning environment. The PL profiles are related to the *Learning to be* goal. Learners monitor their learning progress, enhance their strengths, overcome their weaknesses, and report such actions in the learning profiles. Using the personal learning paths achieves the goals of *Learning to know and Learning to do*. Learners plan for their learning, search for knowledge, and solve learning problems. The flexible learning environment enhances the *Learning to live together* goal achieved through flexible seating, cooperation, and empathy. The alignment between the general goals of Connect4, the textbook, and the PL strategies enhances the potentiality of developing the EFL morphological skills which are included in the content of Connect4.

## Method

### Research Design

The quasi-experimental pretest posttest design was used in this research. An experimental group and another control group were pretested and post tested on the Morphological Test.

### Participants

The research participants were 50 fourth year primary school students randomly selected from a public school in Egypt. They were divided into an experimental group and a control one. The Independent samples "t" test ( $t=1.29$ ) showed the equivalence of the research groups.

## Instrumentation

### Morphological Skill Checklist

The checklist was designed according to research mentioned in the review of literature and studies, like Asaad et al. (2022) , Arviyolla &

Dahnilsyah ( 2022) , Soliman et al.(2023), Wahid & Farooq (2019), and Zhang & Zou ( 2020).

### **Purpose of the Checklist**

This checklist aimed to identify the EFL morphological skills suitable for fourth year primary school students.

### **Construction of the Checklist**

The initial form of the checklist consisted of fifteen skills, but the jury members recommended the merging of some skills, such as morpheme forming, and morpheme discrimination were merged into identifying morphemes in words. They also suggested the deletion of some skills to be targeted in later school years, like decomposing morphologically complex structure, manipulating the morphological components, differentiating between real and pseudo compounds, and morpheme production. Recommendations of the jury members were followed to prove the content validity of the checklist, and the final form of the checklist is in (Appendix A).

### **Validity of the Checklist**

For approving content validity, the checklist was introduced to jury members who were asked to:

- Select the EFL morphological skills appropriate for fourth year primary school pupils.
- Illustrate the reasons for deleting some skills.
- Write other skills that should be included in the checklist.

The recommendations suggested by the jury were followed and the final form is in (Appendix A).

### **Morphology Test**

#### **Test Aim**

The test aim was to measure fourth year primary school pupils' EFL morphological skills.

#### **Test Description**

The test consisted of five main questions to measure the five morphological skills included in the checklist. Each question includes four test items and a practice item with its answer. The total number of questions is 20. The researcher selects words from Connect 4, the school textbook, and the pupils are asked to answer the questions (Appendix B).

### **Test Piloting**

The test piloting aimed to examine the clarity of test instructions and appropriateness of questions. The test timing and statistical features were

calculated. Twenty fourth year primary school students answered the test on October 3, 2022.

### **Test Timing**

The means of times taken by different pupils to answer the pilot test was calculated. The average mean time of answering the test timing was 40 minutes and five minutes were added for test instructions. Thus, the time of the test was 45 minutes.

### **Test Scoring**

The total score of the test is 20 marks divided on the five main questions. The correct answer of each test item is 1, and the total score of each question is 4.

### **Test Reliability**

The Cronbach's Alpha co-efficient was used to calculate the test reliability, based on the results of test piloting. The reliability co-efficient value for the test (0.90) was acceptable.

### **Test Validity**

The content validity was achieved by following the jury members' recommendations. They were asked to judge the following items:

- Appropriateness of the test items
- Clarity of test instructions

The jury members suggested the deletion of some questions, like determining the word family and write two inflectional morphemes of the following words. The initial form of the test consisted of seven questions, the jury members recommended the deletion of two questions, and the final form consisted of five questions (Appendix B).

### **Pre-testing**

The experimental and control groups answered the EFL Morphology Test before the application of the suggested program (see Appendix B). The research groups were pre tested on October 3 , 2022 to determine their EFL morphological skills levels.

### **Post-testing**

Participants answered the EFL Morphology Test on November 29,2022, to examine the effectiveness of the suggested program based on personalized learning in developing their EFL morphological skills.

### **The Suggested Program based on Personalized Learning**

The program was designed according to the review of literature and related studies, *The objectives of the program were as follow:*

- Develop primary school pupils' EFL morphological skills.
- Encourage primary school pupils to be responsible for their learning progress.
- Encourage EFL teachers to focus on form- based instruction inside classrooms.

### **Program Rationale**

The suggested program was based on the personalized learning framework to develop fourth primary school pupils EFL morphological skills. Personal learning profiles, learning paths, and flexible learning environments are the personalized learning strategies adopted in the program. Each student has his own learning profile, where his strengths, weaknesses, learning outcomes, learning progress is recorded by the end of each session. The teacher offers various learning activities for each learning outcome and each student selects an activity. Collaboration with the teacher and other pupils is enhanced through offering supporting feedback and flexible seating.

### **Program Content**

The program depended on Connect 4, the school textbook, which focuses on language skills integration as well as using language in real life situations. The activities included in the textbook encourage students to discuss, explore, and practice the English language (Dutton, 2022). Interactive activities offered on the Website of the Ministry of Education, available on <https://moe.gov.eg/elearningenterypage/#>, are integrated in the session to satisfy students personal learning needs. Besides, the content of the suggested program also depended on the learning resources available on the Egyptian Knowledge Bank, <https://lms.ekb.eg/repository/discovery?sort>. The integration of the textbook, the e-learning platform offered by the Ministry, the resources available on the EKB offered by York press, and educational videos on Youtube.com are useful in designing personal learning paths and flexible learning environments (Appendix D).

### **Program Framework**

The experimental group received 16 Personalized Learning based sessions. The sessions were given twice a week and each session lasted for 90 minutes. The first session was an introduction to the PL suggested

program. The second session offered a general overview of the morphological skills and its importance in language learning. Then, two sessions covered the skills of identifying morphemes in words and segmenting words into morphemes, followed by a revision session. Two sessions focused on the skill of differentiating between affixes and base words followed by a revision session. The skill of using correct inflectional morphemes was covered in two sessions followed by a revision session. Two sessions covered the skill of using appropriate derivational morphemes followed by a revision session. A final revision session was offered by the end of the program covering the morphological skills targeted through the program.

Summative and evaluative assessment were used in the program. The pupils used their personalized learning profiles for self-assessment. They monitored their goals and checked their achievement of different morphological skills. They assessed their learning progress, and the teacher offered them guidance. Also, peer assessment was used as pupils checked each other's answers in different learning tasks under the guidance of the teacher. The evaluative assessment depended on the post administration of the EFL Morphology Test developed by the researcher.

### **Experimental Procedures**

The EFL Morphological Test was introduced to the experimental and control groups on October 3, 2022. Then, the suggested program based on Personalized Learning was introduced to the experimental group. They received 16 sessions on EFL morphological skills using the activities in the Connect 4, units 1,2,3,4,&5; while the control group received regular traditional instruction. Both research groups were post tested on the EFL morphological Test on November 29, 2022, for data statistical analysis.

### **Data Analysis**

The Statistical Package for Social Sciences (SPSS), 26<sup>th</sup> version, was used in data analysis. Descriptive and inferential statistics were used in data analysis to assess the effectiveness of Personalized Learning in developing students' EFL morphological skills.

### **Results**

The research results were based on testing the hypotheses as follows:

#### **Testing the 1<sup>st</sup> Hypothesis**

There was a statistically significant difference between the mean scores of the control and experimental groups in the skill of identifying

morphemes in words at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

Data analysis of the hypothesis was showed in the following table:

**Table 1**

t Value for the Skill of Identifying Morphemes

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Identifying morphemes in words	Control	25	1.36	0.995	11.390	Significant p < 0.001
	Experimental	25	3.72	0.458		

The calculated “t” (11.39) for identifying morphemes in words skill was more than the tabulated “t” (3.745), so hypothesis one was accepted.

### Testing the 2<sup>nd</sup> Hypothesis

There was a statistically significant difference between the mean scores of the control and experimental groups in the skill of segmenting words into morphemes at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

The hypothesis data analysis was illustrated in this table.

**Table 2**

t Value for the Skill of Segmenting Words

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Segmenting words into morphemes	Control	25	1.32	0.557	18.984	Significant p < 0.001
	Experimental	25	3.80	0.408		

The calculated “t” (18.984) for the skill of segmenting words into morphemes was more than the tabulated “t” (3.745), consequently the hypothesis was accepted.

**Testing the 3<sup>rd</sup> Hypothesis**

There was a statistically significant difference between the mean scores of the control and experimental groups in the skill of differentiating between affixes and base words at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

The following table displayed the data analysis of the 3<sup>rd</sup> hypothesis.

**Table 3**

t Value for the Skill of Differentiating between Affixes and Base Words

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Differentiating between affixes and base words	Control	25	0.88	0.666	8.363	Significant p < 0.001
	Experimental	25	2.84	1.143		

The calculated “t” (8.363) for the skill of differentiating between affixes and base words was more than the tabulated “t” (3.745), thus the hypothesis was accepted.

**Testing the 4<sup>th</sup> Hypothesis**

There was a statistically significant difference between the mean scores of the control and experimental groups in the skill of using correct inflectional morphemes at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

Data analysis was presented in the following table.

**Table 4**

t Value for the Skill of Using Correct Inflectional Morphemes

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Using correct inflectional morphemes	Control	25	2.36	0.757	4.917	Significant p < 0.001
	Experimental	25	3.16	1.143		

The calculated “t” (4.917) for the skill of using correct inflectional morphemes was more than the tabulated “t” (3.745), therefore the fourth hypothesis was accepted.

### Testing the 5<sup>th</sup> Hypothesis

There was a statistically significant difference between the mean scores of the control and experimental groups in the skill of using appropriate derivational morphemes at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

The data analysis of the hypothesis was presented in the following table.

**Table 5**

t Value for the Skill of Using Appropriate Derivational Morphemes

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Using appropriate derivational morphemes	Control	25	1.68	0.748	6.553	Significant p < 0.001
	Experimental	25	3.24	0.926		

The calculated “t” (6.553) for the skill of using appropriate derivational morphemes was more than the tabulated “t” (3.745), so the fifth hypothesis was accepted.

### Testing the 6<sup>th</sup> Hypothesis

There was a statistically significant difference between the mean scores of the control and experimental groups in the overall morphological skills at ( $\alpha \leq 0.01$ ) level of significance in the post administration of the EFL morphological test in favor of the experimental group.

The following table illustrated the data analysis of the hypothesis.

**Table 6**  
t Value for the Overall Morphological Skills

Skills	Group	N	Mean	Std. Deviation	T-Value	Result
Overall morphological skills	Control	25	9.24	2.296	10.686	Significant p < 0.001
	Experimental	25	16.76	2.666		

The calculated “t” (10.686) for the overall morphological skills was more than the tabulated “t” (3.745), hence the hypothesis was accepted.

To calculate the effect size for Personalized Learning on the morphological skills, Eta square ( $\eta^2$ ) and Cohen’s (d) were calculated as shown in this table

**Table 7**  
The Effect Size for the Personalized Learning on Morphological Skills

Skills	Test	N	Mean	Std. Deviation	T-Value	Result	Eta Squared ( $\eta^2$ )		Cohen’s d
							Value	Effect Size	Value Effect Size
Overall morphological Skills	Pre	25	6.24	2.332	17.057	Significant at 0.001	0.924	large	7.0 large
	Post		16.76	2.666					

To examine the effectiveness of the suggested program based on Personalized Learning, the modified Blake's gain ratio was calculated on the pre-post test means of the experimental group as presented in the following table:

**Table 7**  
Effectiveness of Personalized Learning in Developing Morphological Skills

Variable	Pre-Mean	Post-Mean	Max-Score	Blake's M G R	Effectiveness
Overall morphological skills	6.24	16.76	20	1.29	Exist

As revealed in the previous table, there was statistically acceptable effectiveness of Personalized Learning in developing EFL morphological skills. The value of Blake's modified gain ratio (1.28) of the suggested program showed its effectiveness, existed in Blake's range of effectiveness (1-2). Hence, the suggested program based on Personalized Learning was effective in developing fourth year primary school pupils' EFL morphological skills.

### Discussion of Results

Based on the statistical analysis, the personalized learning based program was effective in developing fourth year primary school pupils' EFL morphological skills. The effect size values for the Personalized Learning Eta squared ( $\eta^2=0.924$ ) and Cohen's  $d$  ( $d= 7.0$ ) were large. The calculated  $t$  value for the overall morphological skills ( $t=10.686$ ) was more than the tabulated ( $t= 3.92$ ). Also, the calculated  $t$  value for every morphological skill was more than the tabulated one. Therefore, Personalized Learning developed fourth year primary school pupils' EFL morphological skills. The order of the developed morphological skills was: segmenting words into morphemes ( $t=18.984$ ), identifying morphemes in words ( $t=11.390$ ), differentiating between affixes and base words ( $t=8.363$ ), using appropriate derivational morphemes ( $t= 6.553$ ), and using correct inflectional morphemes ( $t= 4.917$ ).

The three PL strategies: PL profiles, personal learning paths, and flexible learning environments were integrated with the high scores achieved in the skill of segmenting words into morphemes ( $t=18.984$ ). The use of different videos from different sources, such as [www.Youtube.com](http://www.Youtube.com), [www.ekb.eg](http://www.ekb.eg), and <https://moe.gov.eg/elearningenterypage> offered different learning paths for pupils. The use of different tasks, such as composing and decomposing, introduced using the round table strategy maintained the engagement of all pupils. Pupils enjoyed the use of drums while segmenting words. The segmentation skill is the outcome of the skills of identifying morphemes in words and differentiating between affixes and base words. The use of hide and seek game, pupils' theatre, and learning projects allowed pupils to select the suitable personal learning path. They developed their performance and recorded their progress in their learning profiles. The flexible learning environment developed the pupils' belongingness to English classes.

According to pupils' personalized learning profiles, they enjoyed the word formation instruction. The morphological awareness skills were introduced according to their levels of complexity. Pupils differentiate between free and bound morphemes. They compare content words to function words. Prefixes were introduced to pupils before suffixes. While prefixes change only the word meaning, suffixes change the meaning as well as the grammatical function of the word. Pupils played the roles of suffixes and affixes. They combined morphemes to form new words. They enjoyed the "guess what" game when differentiating between inflectional and derivational morphemes. The learning flexibility and free movements increased the pupils' engagement. Pupils practiced deriving different words from the same word. The availability of different activities offered PL paths through tailoring learning to satisfy each pupil's interests, strengths, and needs. Diverse learning activities were based on pupils' readiness.

The use of different learning platforms in the Personalized learning paths increased pupils' learning motivation and facilitated the access of knowledge. Teachers designed the personal learning paths according to the pupils' learning profiles. Pupils chose activities to achieve their learning goals, adjust their learning tracks, and became responsible learners. Pupils become owners of their learning through continuous self-monitoring accompanied by immediate feedback.

### **Conclusions**

To the best knowledge of the researcher, there is a paucity of research on the effectiveness of personalized learning on developing EFL morphological skills. Since EFL morphological skills are related to reading and oral performance, the results of this research is aligned with those of El-Bassuony et al.(2020) and Al-Atabi (2018). El-Bassuony et al.(2020) revealed that using a Personalized Learning (PL) model developed preparatory school students' EFL reading skills in Egypt. Al-Atabi (2018) showed that using different personalization techniques developed preparatory school students' EFL oral performance in Iraq.

### **Recommendations**

Based on the findings of the research, the following recommendations are formulated:

-EFL teachers should offer personalized learning instruction in the classroom.

- Enough time should be allocated for developing EFL morphology in schools.
- EFL curriculum designers should integrate the learning activities available on the Egyptian knowledge bank in each lesson.
- Researchers should add form based instruction to the communicative approach in their research.

**Suggestions for Further Research:**

- Examining the effect of form -based instruction on developing students' EFL reading skills.
- Investigating the effect of Personalized Learning on developing self-regulation skills.
- Investigating teachers' perceptions on the integration of Personalized Learning in EFL classrooms.
- Assessing the effect of Personalized Learning on students' EFL learning motivation.

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