ARTIFICIAL Intelligence

by Dr. Andrew Blasky, Alfonso Lara and Kevin McClure

nexgen's neo™ Study App is a powerful mobile application, employing the latest AI technology. Learners master English rapidly while being engrossed in language activities. The neo Study App was created by nexgen using DynEd® International's syllabus, course content, and industry-leading algorithms, but updating them for mobile devices. nexgen then added a powerful artificial-intelligence (AI) system. This nexgen AI is an 'expert system'. It means that the nexgen AI system behaves in the same way that a human expert would. In a learning system, the human expert that is being imitated is a language teacher. Behaving like a human teacher means that the nexgen AI system does the following:

- starts learners in a course level that is appropriate for their individual needs.

- provides clear goals for the learner in a globally recognized framework, the Common European Framework of Reference for Languages (CEFR).

- lays out a course of study for the learner, ordering the activities in a way that helps each individual learner master key concepts and content quickly.

- provides learners with a limited number of choices that allows learners some degree of control over their learning, based on their learning styles and personal preferences.

- gives individual learners advice about how to use the courseware most effectively—for example, to record their speech with speech recognition (SR) technology.

- gives each learner immediate feedback on their comprehension of the content and concepts.

- guides learners through activities in a brain-effective manner, so that new concepts and content move from working memory to long-term memory, the essence of learning.

In order to meet these sophisticated goals, the nexgen AI system incorporates seven major features that benefit learners.

Adaptive content

In the neo Study App, the content that learners study changes according to their individual needs. As learners make choices and answer questions, neo's content adjusts to their changing knowledge of English. Learners each have their own way of learning and the neo Study App is equipped to help them all reach their level goals at the fastest possible rate. For example, some

learners prefer to move through content quickly, wanting to experience new language with each study session. Success for these 'high sensation seekers' leads to more difficult and varied content. Other learners prefer to spend more time with each new concept; neo gives them more exposure and opportunities to repeat each concept, each lesson.

In addition to adapting to learners' individual learning preferences, nexgen's AI system reduces learners' feelings of stress and anxiety, feelings which greatly interfere with learning. Because new content and concepts are only introduced when learners are ready for them, learners relax and learn more quickly.

Adaptive learning is evident in every aspect of the neo Study App. nexgen's AI system powers the neo Study App's adaptive Placement Test. Placement in bricks-and-mortar schools is often inaccurate and time consuming. The neo Study App's Placement Test uses nexgen's AI system to personalize each testing session. Learners who answer test items correctly receive more difficult test items. As soon as test takers reach test items that are too difficult for them, they receive their Placement Test score. This limits feelings of frustration with having to answer test items beyond their knowledge.

In addition, nexgen's AI system ensures the consistency and accuracy of the Placement Test by double-checking a learner's placement level. Once the approximate level of the test taker has been determined, the user is given additional level-specific questions to confirm the placement and provide additional detail. A post-test report gives intelligent feedback on a test taker's strong and weak areas of English. Accurate placement is another way in which nexgen's AI system speeds learners' progress. Learners who are placed in a course that is too difficult or too easy may grow frustrated or bored and learn little or nothing.

The neo Study App's use of adaptive content in all aspects of its courseware is a giant positive leap to a level of effectiveness above traditional classroom learning. Teachers are rarely able to give learners content that is suitable for their individual needs, something which comes easily to nexgen's AI system.

All of nexgen's adaptive capability is possible because of the sophisticated and ongoing analysis of learners' behavior that underlies the neo Study App's courseware, a continual state analysis.

nexgen's AI system's continual state analysis

State analysis in courseware simply refers to an AI system's ability to evaluate where a learner is and then use that knowledge to create the best future study path. nexgen's AI system continually evaluates learners' current condition, including the learner's knowledge and performance. It then uses that analysis to make decisions or recommendations about the learner's future study. It is what allows the neo Study App to provide a highly personalized and effective learning experience. nexgen's AI system reevaluates the learner's state on a per-lesson basis.

One major advantage of continual state management is the adaptive feedback that can be given to learners. Intelligent, individualized feedback on performance is provided by the teacher-like responses, positive and negative, that follow learner actions. Audio teaching responses reinforce key language, at a level that would be difficult for a human to provide. This frees up teachers to give learners feedback on more complex concepts.

Point system

A key feature of the neo Study App is the point system that guides learner behavior and makes the learning experience enjoyable. As learners complete each activity, they are given vivid feedback on their success and on the value of the task that they have just completed. A running total of their points is easily accessible on every screen to show their overall progress through the content. In classrooms, instructors use grades and completion of assignments to give learners feedback on their performance. nexgen's AI system uses points to accomplish this same objective.

nexgen's artificial-intelligence system monitors every interaction the learner has within each lesson and awards points in proportion to the educational value of that interaction. This use of points makes sure that learners and coaches receive information on the 'how', or effectiveness, of learning, rather than just the 'what', a list of content studied. Interactions that contribute more to learning earn more points—for example, by awarding a significant number of points for recording sentences with speech recognition (SR). The more accurate the recording, the more points are earned.

Points are also awarded for correctly answering questions. These question-and-answer sequences in the neo Study App are chances for learners to prepare for similar interactions with the live coach in neo LIVE.

Points are also used to control advancement through the courseware. Learners can only receive new content when they have earned the required number of points. In addition, while learners are progressing through the learning content, they are receiving encouragement and reinforcement on a constant basis, more frequent than what teachers or coaches would have time for. The interaction between the learner and the neo Study App system mimics how teachers respond to learners. When learners answer a question correctly, the neo Study App will often repeat or paraphrase the correct answers to reinforce the language. Motivation research has shown that simply repeating a learner's responses has a very positive effect on that learner's confidence and motivation.

Points are given for all aspects of a learner's performance, including understanding the content, speaking accurately and spending time on the critical concepts that form the core of nexgen's pedagogy. A learner's accumulated points total is a constant, visible metric of progress toward the learner's goals. Points provide clarity and motivation to the learner.

A key advantage of the use of points in the neo Study App is that it motivates learners with a game-like interface. Increasing motivation is a key goal; motivated learners work harder and learn faster. Besides giving learners valuable information about their progress, points are valued for their own sake. Modern learners are used to fast-paced, dynamic software and often grow bored with static interfaces. In the neo Study App, when learners earn points, they fly across the screen giving learners an instant reward for their efforts. Research has shown that engaging, game-like interfaces activate the brain's emotional system related to 'play', which facilitates the consolidation of new knowledge in long-term memory.

Points are also a catalyst for satisfying learners' need to see progress towards a goal. Motivation research emphasizes the importance of clear goals and an ability to see progress towards those goals. With the point system in the neo Study App, learners can always see their progress towards their goal, a DynEd certificate based on the Common European Framework of Reference for Languages (CEFR).

Perhaps the most important advantage of points is that intelligent-points allocation clearly demonstrates that when the point total for a Certification Level is reached, the learner has actually mastered the concepts and content for that DynEd Certification Level.

Intelligent control buttons

nexgen's AI system powers the control buttons that learners use to move through the neo Study App's content. The nexgen AI system makes sure that the appearance or disappearance of the control buttons optimizes the learners' experience. Control buttons are available on an as-needed basis to maximize learning and minimize confusion. Each of the neo Study App's lessons has five steps, each with its own control-button display. Learners begin in Step One by simply listening to audio content. As learners progress through the steps, they are guided to interact more deeply with the material through recording and speech recognition (SR) feedback.

Buttons are intelligently controlled by the nexgen AI system so that learners are guided on what to

do at each step with user-friendly graphics. For example, in Step Four, the 'Record' button pulsates to show learners that they must record their voice. When learners finish speaking, the 'Record' button changes into a 'Listen' button.

The intelligence behind the control buttons guarantees that skills are learned and practiced in a brain-effective order. Listening with simple images comes before speaking. Text support is available only after learners have listened to the new language several times. Comprehension questions come only after learners have had sufficient exposure to the new concepts. Study sessions intelligently limit each session to what learners can absorb. Research on maximizing learning emphasizes that short sessions followed by rest periods are critical for moving new language into long-term memory, where it is retained for future use.

Individualized coaching

In addition to activities in the courseware, neo requires one-on-one coaching sessions in neo LIVE. These sessions allow coaches to give learners personalized feedback on their performance and on their progress towards their goals. neo's point system gives coaches an instant view of how far learners have come in completing their DynEd Certificate Level. In these sessions, coaches also help learners use the language that they have been studying in a real communicative situation. For example, if learners have been studying language for describing their daily schedules, the coach will use part of the session to ask the learners about their lives. This is very different from online tutoring services in which tutors use the time to teach new language, leaving little or no time to actually use the language. In neo LIVE, learners use coaching sessions to activate the language that they have already studied in the courseware.

Another significant difference between neo LIVE's coaching sessions and those offered by tutoring services is the close coordination between courseware and coaching. nexgen's AI system ensures that the neo Study App works smoothly with the neo LIVE coaches to ensure a seamless interface between the two parts of the neo experience. nexgen's AI system analyzes the learner's current state and sends the learner's data to a color-coded dashboard that provides easy-to-understand, session-current, personalized information on learners' progress towards their DynEd Certification Goal and gives individualized feedback on learners' comprehension, listening, speaking and pronunciation. Coaches can easily see if learners are using the control buttons efficiently, are struggling with difficult concepts or are simply not spending enough time in neo. nexgen's AI system alerts coaches in neo LIVE if a learner is having difficulty mastering course content. This alert can trigger a coach intervention and a change of level. Classroom teachers and online tutors struggle to deal with learners' individual needs. This is not a problem for neo coaches because of the solid support that they receive from nexgen's AI system.

nexgen's AI powered speech-recognition engine

Teachers recognize the importance of individual feedback for improving learners' speech, but classroom time is limited. nexgen's speech-recognition (SR) engine provides neo Study App learners with individual feedback on every sentence in the courseware in order to move target language to long-term memory and to improve speech. nexgen's SR uses a sophisticated set of formulas in its AI to produce extremely detailed, easy-to-understand speaking feedback to learners. Unlike most SR engines used by digital courseware, the nexgen SR system concentrates on building learners' speaking ability. The focus of nexgen's SR engine is on understanding what the learners are saying; in many digital courses, the focus is on guessing what learners have said, which does not help them improve their speaking. After speaking, learners see an easy-to-understand text display that shows the learner exactly where in the sentence there were speaking problems. In addition, the neo Study App's SR activities build learners' ability to hold complete English sentences in working memory, which greatly contributes to speaking fluency and overall language acquisition.

Conceptual syllabus

One critical difference between the neo Study App and traditional English Language Teaching (ELT) courseware is nexgen's pedagogical foundation, a conceptual syllabus. The key advantage of a conceptual syllabus is that it is based on communicating meaning, not on learning individual structures, such as articles or adverb phrases. Over the past three decades, DynEd International has identified all of the critical concepts that learners must master in order to communicate effectively in English. nexgen has updated this conceptual syllabus for mobile devices and has incorporated it in the neo Study App. Examples of these meaning-based concepts are duration, frequency and probability. Focusing on concepts allows learners to speak English flexibly and to focus on the meaning of what they are saying and what they are hearing. In coaching sessions, learners use the concepts that they have practiced to communicate real information in authentic contexts.

nexgen's AI system powers learners' study paths through nexgen's conceptual syllabus. A key feature of these AI-powered lessons is a prescriptive study path, which makes sure learners encounter and practice critical concepts in the most effective sequence. Learners see new concepts in multiple contexts with enough practice to move new language into long-term memory. The study path is controlled by learner performance, which allows learners to advance only after they have mastered the current concepts. Learners are guided to review lessons where they have difficulty and coaches are notified when learners are struggling.

Classroom teachers and online tutors may not have the ELT training to conduct lessons using modern methods. nexgen's syllabus is designed using the most up-to-date findings from neurolinguistics and language-acquisition studies. This means that neo's concept-based lessons reflect the best practices of skilled teachers of English.

Conclusion

nexgen's AI system provides learners with a holistic experience in which each part of nexgen works seamlessly with the other parts. Learners are intelligently placed into an appropriate level of the neo Study App's courseware. They are guided through lessons in a way that allows them to master all of the key concepts that they need to communicate in English. They are given the feedback that they need to improve. In their coaching sessions, learners have the opportunity to use the language that they have been working with in a communicative setting. Learners have clear goals in a dynamic framework, so they are motivated to practice and master the concepts and content of their lessons. For over 30 years, the researchers of DynEd have studied learners' use of the DynEd learning content. They have taken every piece of learner data and used it to perfect a comprehensive theory of language acquisition that is based not just on this experience, but on the most recent findings in neuroscience. nexgen has taken DynEd's experience and enhanced it for mobile devices in the neo Study App. This makes it the most effective language-learning product available.

Frequently Asked Questions (FAQ)

Why is adaptive content better than courseware that is the same for everyone?

Humans are all different. They learn foreign languages in different ways. Some learners like to move quickly through content and others prefer a slower, steadier pace. Some learners feel a great deal of anxiety about studying a foreign language. Adaptive content allows learners to relax and learn the way that is best for them.

Why is an adaptive placement test better than a more comprehensive proficiency test?

Adaptive tests are faster than a static one-size-fits-all test. Research has shown that adaptive tests can shorten the testing experience by as much as 50% and still complete an evaluation that is more precise than a traditional static test. Our goal for new learners in neo is to get them as quickly as possible into the level that is appropriate for them. We don't want them getting frustrated or bored taking a long test.

What is the advantage of having continual state analysis?

Continual state analysis is the tool which powers adaptive learning. By analyzing learners' performance on a per-lesson basis, nexgen's AI system is able to provide an individualized study path that optimizes performance for each learner. For example, a learner who is mastering new concepts and content rapidly will be presented with additional examples of the new language that are at a slightly more advanced level.

How is the use of points better than giving grades or other traditional evaluations?

nexgen's neo Study App's use of points offers three great advantages. First, it is a simple, clear system that is easy for learners and coaches to use in order to measure progress towards goals and to evaluate performance in a period of time. Second, points are a much more engaging feedback method than grades. They give neo a game-like interface that adds enjoyment to the courseware. Neuroscientific research has clearly demonstrated that adding positive emotions to a learning environment greatly increases its effectiveness. Finally, points allow nexgen's AI system to implement a sophisticated weighting system in which learners' actions earn points in proportion to their learning value. Learners see the number of points earned for each action, constant reinforcement of the relative value of everything that they do.

Why are intelligent control buttons important?

Intelligent control buttons reduce learners' confusion about what they are supposed to do. When there is only a 'Repeat' button in a step labeled 'Listen', learners quickly understand that they should just listen and repeat sentences when they do not understand. In some learning systems, there are multiple buttons simultaneously and learners are confused about what they are supposed to do. Confusion can lead to frustration, which hurts learning. In the neo Study App, learners see only the buttons that they are meant to use.

What does 'brain-effective order' mean?

A brain-effective order refers to the presentation of new concepts and content in a sequence that does not confuse or frustrate learners. It is easy for second-language learners to become overwhelmed by new language; giving learners too much visual and audio input causes cognitive overload. In the first step of every lesson, therefore, limited audio content is presented with clear, simple images that support comprehension. Access to text is allowed only after new language has been listened to.

Speaking—a cognitively more challenging language skill than listening—is delayed until the third step. By strictly regulating what the learner sees and hears, nexgen's neo Study App optimizes the learning experience, reducing learners' confusion and increasing comprehension.

How is neo LIVE's coaching different from tutoring sessions offered by other learning services?

Individualized coaching sessions in neo LIVE are directly connected to what the learner has been studying in the neo Study App. This is possible because of the state-of-the-art coaching dashboard that coaches see. This dashboard gives coaches exactly the information they need to counsel the learner. In addition, coaches can access communicative lessons that require learners to use the language which they have just studied. This is radically different from what is offered by educational companies that provide online tutoring sessions that are not connected with courseware or in which there is little or no connection between what is studied in courseware and what is done in tutoring sessions.

In what way is nexgen's speech-recognition (SR) engine better than other SR engines?

nexgen's SR engine has been specifically built for language learning. It has been designed to listen to what a learner has said and give detailed, intelligent feedback. After they speak, learners see immediate word-by-word feedback in their sentence. A straightforward color code makes the evaluation of each word clear. The points awarded for their entire sentence give holistic feedback. This is very different from commercial SR engines which try to understand what a speaker has said without giving detailed feedback.

Why is a conceptual syllabus better than a traditional structural syllabus?

Learners study a second language in order to communicate information and ideas in a real situation. A conceptual syllabus focuses on the language needed to communicate ideas. For example, a learner may need to make a suggestion, to explain when something happened or to ask a favor from someone. Those are all concepts that are introduced and learned in nexgen's conceptual syllabus. In a traditional structural syllabus, a learner may learn how to form past-tense verbs, but not be shown how to use them in an authentic situation. That is why so many learners cannot use the language that they have learned, even after many years of hard study.

Author Bibliographies

Dr. Andrew Blasky

Chief Learning Officer
Learning Innovation and Development,
DynEd International

Dr. Blasky is responsible for directing the design and development of DynEd and neo courseware and assessments. An English language and literature graduate of Princeton University (B.A.) and University of California, Berkeley (Ph.D.), he has taught in Japan and the United States and was editor of Cross Currents: An International Journal of English Language Teaching. Prior to joining DynEd, he was director of the Language Institute for English at Dominican University, San Rafael, California. He is a frequent presenter at TESOL conferences and has edited several textbooks for English language learners. He has served on the Executive Board of the American Association of Intensive English Programs.

Alfonso Lara

Director of Training
Client Engagement Department
DynEd International

Alfonso Lara will soon be entering his 15th year with DynEd International. Throughout his tenure at DynEd, he has overseen teacher training and implementation for all regions, working with regional managers, channel partners, distributors and trainers. Currently, in the client-engagement section at DynEd, he works primarily with the AMEA region (Americas, Middle East and Africa) on training and implementation. Besides having extensive teaching experience with English language learners (ELLs), he is also trained social scientist—he was completing a Ph.D. in political science at Stanford University in California (ABD), where he earned an MA in Political Science. He also holds bachelor's degrees in both international relations and French literature from the University of California, Davis. He is a frequent presenter at TESOL conferences and is a certified WIDA content correlator.

Kevin McClure

AI and Assessment Lead
Learning Innovation and Development
DynEd International

Kevin McClure is responsible for developing DynEd's assessments and working with the innovation and development team to create new courseware. He has a master's degree in applied linguistics and 36 years of experience in all aspects of English language teaching (ELT). He has taught refugees, students in the University of Paris, English students at Temple University Japan and corporate learners at the Language Institute of Japan. For eight years, he was the academic director at the ELS language center in San Francisco. For the last 18 years, he has written and edited content for online ELT courseware and managed global teams. He is the author of Talking Together and Putting It Together, two speaking and listening textbooks. He is also the coauthor of the introductory speaking and listening text for the Q series from Oxford University Press.

About nexgen

nexgen is a Silicon Valley company based in San Jose, California with offices in Jakarta, Indonesia. nexgen is dedicated to providing English language learners with sophisticated learning content, which when combined with real-time advanced AI allows learners to achieve their English goals–guaranteed.