Prodigy (working title)

We distinguish between four major components:

1. Game Content - Static / Dynamic
2. Game Rules – Variant / Invariant
3. Content Indexing
4. Linguistics
5. a. Static Game Content is any that is changed by the engine developers

b. Dynamic is one that may be altered by content editors: Teachers, Tutors.

2. a. Invariant Game Rules are those that are controlled by the engine developers.

b. Variant are those who may by modified by content editors: Teachers, Tutors.

3. The Indexing system is responsible for manipulating persistent content.

4. Linguistics holds all responsibilities concerned with semantic content (such as translation and linguistic dictionaries).

Introduction

Learning a new language is a pain. Unless it’s your first, you’re in for a bumpy ride. Why is it so? Well, that depends actually, but experience shows it is a combination of lack of confidence, and fear of new and unknown grounds. Couple this with the fact that you are not a youngling anymore, and have been through a thing or two, worrying about something you don’t HAVE to do, often seems too much, and quitting very tempting…

This goes well with any person taking lessons in learning a second language. Be it within the confinements of a public or private school, second languages often do not receive the attention they deserve. I believe it is not a cause of personal dislike for one, but rather the unwillingness of students to be challenged in such a field.

In my experience tutoring English, I have seen people, from the age of sixteen to sixty and above, ask themselves the same question every day: When will I know it already? The truth is there is no answer to this question. There is no such concept as a limit to what you can study. Speaking, Reading, Writing etc. are all skills in a language. Skills require practice as a sharpening tool.

WHO LIKES TO PRACTICE?

Probably very little, unless it is especially fun and engaging.

Enter Prodigy

Prodigy is an online game designed to encourage second language students to practice, and assist teachers with creating engaging content – and lots of it.

Prodigy is currently set to be marketed as an off the shelf product.

Learners are rewarded and acknowledged for their achievements, engaged in a dynamic environment, and motivated to go beyond the minimal requirements.

Students track their progress, accumulate experience in the virtual school and engage in competitive exercises with their friends.

Prodigy allows schools to create custom made syllabuses for learners with no limitation of the amount of content that can be added.

Teachers may track a student’s virtual character and gain insight of his progression. They may also participate in activities with students.

Vision

For the School, for the Students

Various approaches and methods exist for teaching second language learners. We shall not try nor is it possible to accommodate all. The practice model is a simple one, and is based on the following principles:

* Focus on a single dominant subject in every lesson.
* Present challenges to students regarding a lesson.
* Validate comprehension of a number of lessons sharing a common feature.

Most schools follow the same pattern:

* Define subjects of interest based on the chosen approach.
* Create short and focused lessons concerning a subject.

From these subjects, curriculums are created. In one, various subjects are sequenced by order of teaching and share a single goal, such as a predefined level of skill or perception in a language.

This process of teaching or practicing defines the path a student follows, and it is reflected through in game progression.

The first obstacle I believe most teachers encounter, is finding a unique and reachable way to present practical content to students. This is a skill most teachers acquire through experience. Practice is key to mastering a language, and should get the attention it deserves.

A second but no less important obstacle is a low or nonexistent mechanism for tracking **real** student progression. Prodigy enables schools to follow up on students with regards to their practice history and social interaction. Accurate data storing enables schools to draw insightful information regarding curriculum progression.

Requirements

Our client is anyone who wishes to exercise language learners completely online. It may be an existing language school, or an independent person.

The first and largest requirement is to create exercises

UC1: **Manage Exercises**

This should be based on a curriculum

UC2: **Manage Curriculum/School**

A third is to follow up on students

UC3: **Manage Students**

Additional ones follow. (Following ‘//’ is what we gather to affect system architecture/design)

UC4: have access to all exercises all the time. //cloud storage

UC5: allow more than one user to modify the content of an exercise. One creates, others may add questions. //user profiles

UC6: gather statistics of student progression as a whole. //online real time data accumulation

UC7: manage dynamic syllabuses, with new content added on the fly. //cloud storage, content updates

UC8: define student profiles that match a certain syllabus for differentiating between learning paths. //student user profiles

These requirements are to be merged with game design requirements and together form the system.

The Exercises

Exercises are the heart of the system. They are the content of individual games. They are managed by teachers (the creators of content), and engulfed in a gaming environment when presented to students.

The following steps concern the creation of an exercise as usually done by a teacher (Order is varying):

1. Select the subject of practice. The subject of an exercise is the subject of a lesson.
2. Select the preferred way to check individual exercises. Here the teacher must decide whether the set of possible answers is technically finite or not (to be reviewed later).
3. State the instructions required to fulfill the exercise. E.g. (add “a” or “an” where necessary).
4. Until completion
   1. Enter an exercise item. This is a unique context associated with the instructions of the exercise.
   2. Write a solution to the previous item. Add explanations and notes if necessary.
5. Define a scoring scheme for each exercise items.
6. Name the exercise (optional).

The following presents three common types of language practice exercises (examples included).

Syntax Related – practice the syntax of the language.

1. Missing Content – any exercise that requires a learner to fill missing text from an assortment of possibilities. The physical requirement is not important. If a student is required to fill missing spaces by hand or select from a range of possibilities is not an issue. The options to answer – the context of an exercise – should be available to a student. This must hold in order to tightly couple an exercise with the subject of practice.

*There isn’t \_\_\_ boot-polish in this tin.*

*Add “some” or “any”.*

For example, take the following missing content item:

There are \_\_\_ people at the bus stop.

When a student sees such text, he immediately understands he must fill in the missing content. But if no further instructions and context is given, this item may assume multiple correct answers. The following solutions are correct, given different contextual meanings:

* + - * Some, Many – fill the appropriate adjective
      * Six … - practicing number given a clue (6).

1. Editable Content – any exercise that presents complete content items and requests a student to alter the content in some way.

*Balls are toys.*

*Put into the singular.*

Knowledge Related – practice knowledge of language or culture.

1. Matching – any exercise that presents complete content items and requires a student to enter an answer matching the content item.

*Black, blue, gray, table.*

*Select the odd one.*

All exercises share one base template, made of the following:

1. A Subject: name
2. A Teacher: name
3. Instructions: how to accomplish the task, received from teacher.
4. A solution: mapping between items and answers with additional (optional) explanations per answer.
5. Content Items: a set of unique items that are to be answered.
6. Answer presentation: how a student enters answers, respectful to the task.
7. Attached contextual media (optional): text, image, animation, sound.
8. Additional guidance: notes and tips.

Some Exercise Templates

The first concrete template we define is a **multiple answer, missing content exercise**. In this exercise students are requested to select the correct answer from up to four different options. An answer is made of all the missing content in an item, and only one answer is correct. This exercise is a type 1 exercise (syntax – missing content).

The following steps are done in order to create such an Exercise:

A teacher selects a subject from a syllabus. He selects an exercise template matching the above. The template is initialized with information about the subject referenced and details of teacher. Teacher repeats the following steps for each item in the exercise:

1. Enter a sentence in its missing form.
2. Select points where content should be injected, minimum of one and up two three.
3. For each such point, specify one correct answer, and up to three more incorrect ones. Each answer is made of a maximum of two words. Answers may be empty, specifying no additional content should be supplied (as a “mine”).

A diagram demonstrates:

I think it

a night.

Complete the above:

1. Are, it
2. Do, you
3. **Is, it**
4. Is, you

time we call

Injection Points:

**is**, are, do

you, me, **it**

Permutations of possible answers may be done by system and changed dynamically.

Games

A game contains a unique task to accomplish. These tasks are defined by us, the game designers. Content (questions and exercises) is added to a game by teachers. A teacher selects a game through which he wishes to practice the subject of a lesson. The content is inserted while conforming to the structure of a game. We shall concern ourselves with one syntax related game and one knowledge related, for the time being.

All games are played online, and all may be played in three different modes:

* Solo
* Dual
* Rumble

In Solo mode, each game is run with only one player, no opponents. The game is run continuously, and players may stop and resume it at any time.

Dual mode introduces the VS gameplay, where two players compete for the highest score.

Rumble mode introduces Group VS Group play, where two groups compete for the highest score.

In both Dual and Rumble modes, gameplay is split into rounds limited by time or number of questions to answer. Games played in these modes may have varying number of rounds (default is 3). At the end of the last round

The first game is called **BinaryRush,** and is a representation of the common true/false questions we have encountered countless times in the past.

Model and Design

The main character of the game is the student. The more he plays, the more his character evolves. The path one is guided through a game is his syllabus. The game is centered on this content, but it does set a limit on character progression. Any student may play as much as he/she would like, and teachers may always introduce new content.

A syllabus is modeled as an ordered set of lessons and validation points. The following diagram demonstrates:

Moving up

…

Lesson 1’

Lesson N’

…

Lesson 1

Lesson N

The subject any lesson introduces is assimilated into a student with practice. Practice is done through exercises, requesting you to accomplish a relevant task.

The exercises are at the heart of the game. They are short assignments a game character is required to conquer for it to progress. They assume a different look and feel, and each is used to present practical content in different formats.

An example (question from *Living English Structure*):

*Add “a” or “an” where necessary*

1. . . . cigarette is made of . . . tobacco and . . . paper.

The subject of the lesson this exercise practices, is “*Countables And Uncountables*”.

The question requires you complete missing words. Following questions all share this task.

An exercise holds a Solution to all items in it. It is a mapping between Questions and Answers.

A quest/stage is a lesson concerning one major subject, as taught at school. Stages are sequenced linearly, as defined by school. At the end of a number of stages (greater than one), there is a quiz concerning the subjects taught.

At the end of a number of quizzes (greater than one), there is a single test. A test is used to separate groups of subjects. A quiz is used to verify knowledge of one or more subjects, and to unlock following subjects.

Construction of a curriculum, or game progression model, uses the following building blocks:

* Lesson – concerns a single subject.
* Quiz – concerns at least two lessons.
* Test – concerns at least one set of subjects identified by their quiz, and at least one more subject with no quiz assigned.

Game progression is linear throughout the curriculum. Lessons that share the same quiz may be approached without any order. They should however be sequenced in a manner reflective of the real syllabus, as the recommended order of practice.

Online Game Play

When a player first joins a school, he may select (or be automatically assigned) a profile determining a recommended curriculum. Syllabuses are made of a sequence of lessons, quizzes and tests. When a player practices a lesson, it is analogous to him being present in a Class Room. Assuming he is alone, he practices exercises with no time limits or disturbances.

When a player starts a lesson, he enters a virtual Class Room. In a class room there may be any number of players currently practicing the subject at hand. When a player first joins, he is assigned to practice independently.

From this scenario of multiple players solving exercises individually, two alternate scenarios appear that incorporate interactive gameplay between players.

The first is a dual. A player may challenge another in the context of an exercise. Such an exercise must hold a minimal number of questions in order to be the subject of a dual. In a dual, the two players compete for the most perfect completion of the exercise through 3 separate rounds. Each round is limited by time, and presents a number of questions from the exercise total. At the end of the three rounds, a winner is selected. If one is not found (a draw), an alternate gameplay begins on turn by turn basis. A question appears

The second is group play. A player opens a group

Every lesson is made of practical exercises. A player is asked to accomplish a number of exercises in order to finish a lesson.

Exercises are the heart of the engine. Exercise formats are designed by developers, and must be separated architecturally from the rest of the modules.

A single Exercise has a unique format and contains questions conforming to this format.

Quiz and Test are supersets of exercises of various formats.

The following illustration demonstrates the construction of such a curriculum:

…

…

Lesson 1

Lesson N

Lesson 1’

Test

Complete all subjects

progression

Lesson N’