Adapt Learning: Adapt Framework Concept and Vision

Document control

Abstract:	Describes the concept of the Adapt Framework		
Author:	Sven Laux, Daryl Hedley, Paul Welch	Version: 1.0	Date: 27 / 11 / 2013

Summary of Changes:	**Versions**	**Date**	**Description**
	1.0	27 / 11 / 2013	First version of Adapt Framework concept document

Purpose of document

The purpose of this document is to outline the vision and concept of the Adapt Learning Framework. It contains a concept diagram, similar of a mind map of the key functionality, components and elements of the underlying code framework, which make up the programming logic of the e-learning course.

This document is not a specification document. It is intended to help the project team and wider community understand the full product we are aiming for. As such, the document will therefore set the context in discussions about requirements, system architecture, specification etc.

The document is also intended to help newcomers to the project to get an overview.

What is the Adapt Framework?

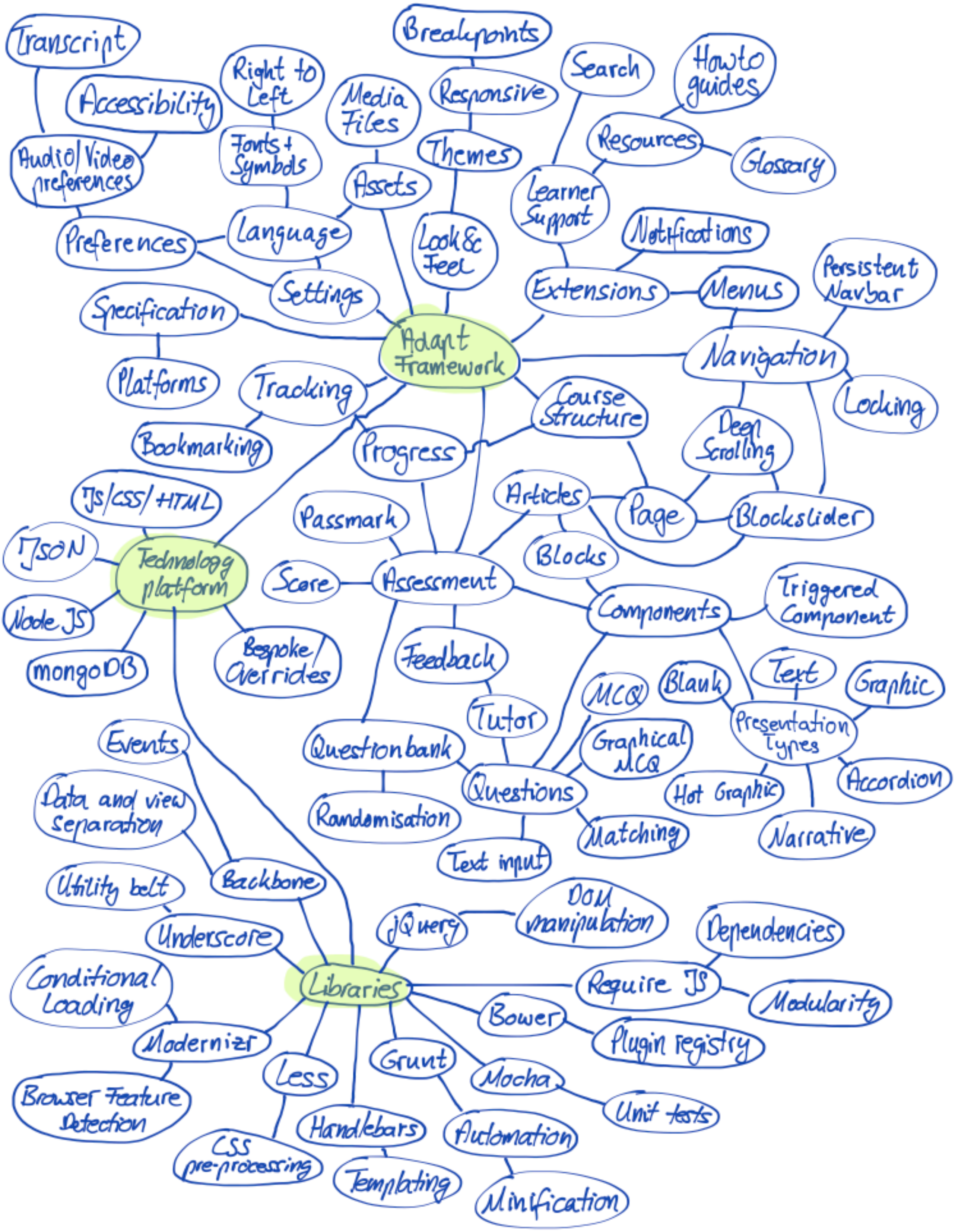
The Adapt Framework is a generic, modular and reusable codebase for developing single version, responsive design e-learning courses. The codebase forms the program logic, which runs as part of the e-learning course in the Learners browser. It is open source and designed with developers in mind.

Anyone with a desire or need to create learning can use Adapt. The framework is aimed at developers and they can work directly with it. An authoring tool (Adapt Authoring Tool) exists separately as part of the same open source project, which is aimed at non-technical end users.

The Adapt Framework was built for e-learning and has core features like tracking completion status and assessments. E-learning courses, which are built on the Adapt Framework can display across multiple device types. The content responds (adapts) to the users screen size.

The Adapt Framework is powered by JSON data. Depending on what the JSON attributes are set to, the Adapt Framework will render different types of layouts and components.

Concept overview diagram



Explanation

ID	Node title	Description
	Adapt Framework	The Adapt Framework is the program logic of a published e-learning course, which runs in the browser. It is the generic code, which makes up the output of the authoring tool.
	Look & Feel	The appearance of the e-learning course, which includes branding, art direction themes etc.
	Themes	A theme is the generic look and feel. It captures display settings, which apply throughout the course. This includes CSS styles, icons, base colours and background images. Components and extensions inherit the base colours and generic icons but have to define their own layouts.
	Responsive	Responsive design is at the heart of the Adapt Framework and enables single version output, which adapts according to the device resolution and capabilities. We have implemented responsiveness is by defining pixel-width breakpoints (*see below*). The Adapt Framework is fully responsive, meaning that as the window width increases or decreases, the content adjusts automatically. If the width (in pixels) goes beyond a breakpoint, different styles and classes are applied to the content.
	Breakpoints	Breakpoints are defined in numbers of pixels. They determine points in the width of the screen, at which different styles are applied to the on-screen content. There are three major breakpoints, which roughly reflect the three m main device types (smartphone, tablet and laptop/desktop).
	Settings	Settings reflect the configuration options of the generic codebase.
	Language	The language is one of the main configuration settings. Courses can be packaged to contain multiple languages within a single course package. The language setting determines the default language to be used and whether to display the option of choosing the language to the end learner.
	Fonts & symbols	Fonts and symbols are a consideration as special characters or particular fonts are not ‘websafe’ and may have to be shipped with course. This node is in the concept diagram to remind us of particular requirements when working with languages other than English.
	Right-to-left	Depending on the language, the reading order may be right to left, e.g. in the case of Hebrew. This node is in the concept diagram to remind us of particular requirements when working with languages other than English.
	Assets	‘Assets’ refers mainly to content images or animations used in the course. In most cases, the assets will be language independent. However, on occasion there may be differences in the imagery used for different languages, e.g. where a graphic contains text or where different graphics are used when localizing (as opposed to simply translating) a course.

	Media files	Media files are also assets but refer more specifically to audio / video files, which are used in the course. Media files are more likely to be language dependent, especially when they contain an audio track.
	Preferences	Preferences refer to settings the learner can change in order to adjust the display and behavior of the course. This includes audio/video and accessibility related preferences (such as high contrast look & feel) in particular.
	Audio / video preferences	Audio/video preferences enable learners to change the default behavior of audio / video assets for a course. This includes enabling/disabling audio, setting the volume and deciding whether a written transcript for audio should be displayed alongside (or instead of) the media file.
	Accessibility	Accessibility settings/preferences are intended to help users with visual or motor impairments access the course.
	Transcript	A transcript is the content of the audio track (in particular) expressed as on-screen text. It enables delivery of the content to learners who are not able to play back or hear / understand the audio track.
	Extensions	Extensions are a type of plug-in. The purpose of extensions is to enable developers to extend the functionality of the course without having to modify core code. Extensions contain functionality, which is not directly embedded in the article / block / component structure. For example, a course glossary and the 'Tutor' to deliver feedback.
	Learner Support	Learner support is functionality that provides additional information, outside of the core content presented within the Adapt pages. Examples might be glossary, resources, page level progress and a search feature.
	Search	The search functionality enables learners to search the course for specific content.
	Resources	Resources are additional and related content items, such as reference materials and background reading. They may exist as part of the course or in downloadable format (e.g. as PDF documents).
	How-to guides	
	Glossary	Reference section showing terms used in the course and their descriptions.
	Notifications	Notification is a messaging center that allows Adapt to flag information to the learner. In addition, the message can also provide choices which are linked to particular events (for example, on selection of the menu button 'There are still unfinished components on this page, are you sure you want to return to the menu. <YES> <NO>)
	Menus	A mechanism for selecting a sub menu or page within a course.
	Navigation	The process of navigating within and between the various pages of an Adapt course.
	Persistent Navbar	The bar at the top of the page, which contains access to the sub menu feature

		(including ‘Back’ and the learner support features) and the page level progress.
	Locking	The ability to limit access to pages or specific blocks within a page until an event has occurred.
	Deep scrolling	The most typical layouts are likely to be based around a deep scrolling page where blocks stacked one on top of the other.
	Blockslider	Block slider allows for the presentation of content within a lateral scrolling layout with blocks placed side by side, rather than one on top of the other as in deep scrolling.
	Course structure	The arrangement of the various pages in a hierarchy, which makes up a course.
	Page	A page is a structure, which consists of at least one article and a single block which houses one spanned or two single components. A page can contain as many articles as needed.
	Articles	An article is the next largest structure after a page. The layout of the blocks within a page can change but not within a single article. For example a page, which begins with a deep scrolling layout and which then moves into block slider must occur within 2 articles. An article has a title and body (of initial text) and a background graphic. In addition, some functionality is applied to articles and not pages. For example, you will have an assessment article, not an assessment page.
	Blocks	Blocks can be thought of as containers for components. In fixed layout eLearning a block would be analogous to a page. Blocks house either one single width component or two single width components. A block also has a title and body (of initial text) and a background graphic. In larger sized screens a block will typically display 2 components side by side, on smaller, smartphone sized screens, the components are placed one on top of the other.
	Components	Components sit within blocks and are used to present the course content. A component contains a title, a body (initial text) and a widget / piece of interactivity. This widget element is what differentiates the various component types. Any two single width components can be combined within a block. A spanned component will always have a single width full back to ensure it can be rendered on a smartphone-sized screen.
	Triggered component	A component which is triggered via the selection of a link or icon that sits on the background graphic for the block, rather than one which is already displayed upon page load.
	Presentation types	Components, which focus on presenting information.
	Blank	Creates single or spanned space on the page creating a window through to the background imagery.

	Text	A single or spanned component. This is the only ‘proper’ component (see blank) that doesn’t have a widget consisting of a title and body. If spanned the same text will be ‘redrawn’ into a single sized component.
	Graphic	A single or spanned component. If spanned the same image will scale down and be ‘redrawn’ into a single sized component (Adapt doesn’t load a smaller sized image).
	Accordion	A single width component, which consists of a stack of clickable items. Each item has a heading which, once selected, expands to reveal the accompanying items text. There is no limit on the number of items within an accordion but we’d recommend no more than six. There are no graphics within each items display text area.
	Narrative	A spanned component with a single width component fall-back. The learner can work through a sequence of images with an accompanying piece of display text via a forward icon (a back icon, post item one is also available). When the final item in the sequence is reached the default behaviour is to disable the forward arrow, not to take the learner back to the beginning of the sequence. Each display graphic and text field is accompanied by a title. The single spanned fall-back of narrative makes use of a clickable strapline which, when selected, triggers the display of the accompanying item text On mobile phones the display text is presented in a full screen pop-up, which needs to be closed before the learner can continue.
	Hot Graphic	A spanned component containing an interactive graphic (an image with clickable regions whose coordinates are set via the JSON). When one of the items on the hot graphic is selected a window opens over the image containing some associated text and image that is relevant to the hot spot item selected. The learner has the option of closing this window and choosing another item on the hot graphic or using discrete forward and backward navigation buttons within the display window to work through all the display items in order (the order will depend on the JSON structure). For single spanned full-back, there is no mechanism for selecting items off the hot graphic. Instead the display window functions as a single span narrative.
	Questions	Components, which focus on eliciting a measurable response from the learner. Questions can be used in formative and summative assessments and can contribute to an overall score for the e-learning course.
	MCQ	A single width multiple choice component. The body is used to display the question stem and the widget the options. One or more of these options can be marked as correct. Feedback, delivered by tutor feature, can be either option specific or banded as correct, partially or incorrect. Any ‘number of attempts’ are possible but recommend two as standard. The tutor window must be closed to reattempt

		the question. Indication of performance occurs via the placement of ticks and/or crosses. These icons are only located on the options the user has selected. If multiple attempts are possible, then the 'Submit' button is replaced by 'Reset' once the answer is submitted. Selecting this button removes markings and resets the question, allowing for a further attempt. Once the final attempt is made the reset button is replaced with the 'View Model Answer'. Selecting this button allows the learner to toggle between their own answer and the perfect answer. In model answer ticks and crosses are present on every option. There is no maximum number of question options but best practice would indicate a maximum of 5 or 6.
	Graphical MCQ	A spanned or single width component. Very similar to MCQ in terms of functionality, the only difference being the learner selects one or more icons on an image rather than one or more options from a list.
	Matching	A single width component that provides the learner with a stem presented via the component body, and then a series of statements. Each statement has an associated drop down which contains a series of options, one of which will be correct. All option drop downs require the correct option to be selected to trigger the correct feedback. There is also partially correct and incorrect feedback available. As with MCQ component the option marking, 'Reset' and 'Model answer' functionality is included. There is no limit to number of statements/drop downs or the number of options within the list but best practice would dictate no more than 5 or 6 for each.
	Text Input	A single spanned component. As per matching, the question stem is presented via the component body but instead of statements with accompanying drop down lists, the learner is expected to enter their answers via a free text entry field. Each free text entry fields entered answer is checked against a string and if present then it's marked as correct. All free text entry fields need to be matched as correct to mark the component as correct. As with all questions, partial and incorrect feedback options are available. Number of attempts and number of question options are not limited other than by best practice. The option marking, reset, model answer and number of attempts are also standard and as described above.
	Assessment	An assessment is a sequence of questions, contained within an article, which can generate a score upon completion.
	Score	The score within an assessment is the number of questions answered correctly and displayed as a % or as x (correct answers) out of y (total number of questions).

	Feedback	Feedback is provided (via the ‘tutor’; *see below*) for question components as either correct/partially correct/incorrect. Alternatively you can also present feedback specific to the option chosen.
	Tutor	Tutor is the mechanism used to automatically present feedback upon the attempting of a question component.
	Questionbank	A bank is a collection of questions that can then be used, with randomization, to create an element of variability between different sittings of the same assessment. There is, in theory at least, no limit to the number of banks or the number of questions within them. All question components can be used with a bank.
	Randomization	Randomization is the process of, and rules governing, the selection of question from the question banks to create an assessment article.
	Tracking	The ability to track a users progress through a course. This is done through SCORM or Tin-Can/xAPI and enables LMS's to gain information about the user during a course.
	Bookmarking	The ability to reload a course and take the user back to where they finished their last session.
	Technology platform	The set of technologies (technology stack) that the Adapt Framework and the Adapt Authoring Tool are built upon.
	JS/CSS/HTML	Adapt's core foundation technology.
	JSON	All of Adapt's data is stored in JSON format. JSON is formatted in a key and value pairing.
	Node JS	Node JS enables us to run an offline server on our development machines. Node powers our Grunt, Handlebars and Less compiling. Node JS is also the technology powering the Adapt Authoring Tool.
	MongoDB	MongoDB is the NoSQL database that stores our document based JSON data for the Adapt Authoring Tool.
	Bespoke / overrides	For developers we have a bespoke folder that enables us to do overrides / customisations of functionality without having to change the core code directly.
	Libraries	We use a variety of open source code libraries at the heart of Adapts core.
	Backbone	Backbone is a front-end library that enables us to separate our views and from our data. It comes with a built in events system and router to enable us to change pages.
	Events	The Adapt framework is built upon an event system that enables our modules/classes to be separated and modular. One module should not talk to another module. Instead they trigger events that other modules can choose to listen to.

	Data and view separation	By having a clear distinction between our models and views we're able to structure and maintain a growing/large framework.
	Underscore	Underscore is the utility belt for Backbone. It enables Backbone to manipulate objects like Backbone.Model and Backbone.Collection. Underscore also comes with some handy methods that help deal with arrays/objects.
	Utility belt	We use underscore when iterating over arrays or objects with _.each or with Backbone.Collection.each()
	Modernizr	Modernizr is a conditional loader and adds browser feature detection
	Conditional loading	In the Adapt framework we conditionally load scripts based upon which browser the user is loading the course from. Modernizr comes with a built in yepNope conditional loader.
	Browser feature detection	Modernizr attaches classes to the HTML tag based upon browser features. This can be used when styling or adding features and polyfills for different browsers.
	Less	We use LESS as our CSS pre-processor. Less enables us to inherit and store variables that can be used across Adapt.
	CSS pre-processing	CSS pre-processing enables developers to easily and quickly style courses, whilst inheriting styles, passing variables and nesting.
	Handlebars	Handlebars is our core templating engine. We precompile our templates through a Grunt process to enable fast load times.
	Templating	We use Handlebars to load our views HTML. This enables Adapt to be dynamic and act as a one page web app.
	Grunt	Grunt is a node based JavaScript task runner. In Adapt, this is used for automation.
	Automation	We use Grunt to automate our tasks. We use minification, handlebars and less compiling and requireJS optimisation dependency loading.
	Minification	Running $ grunt build - a developer is able to minify all files including CSS and JS files. Minification means removing formatting, which is important for code-readability but not for machine processing, and thus making the code more efficient.
	Mocha	Mocha is a Behaviour Driven Development framework that enables us to run unit tests across our code.
	Unit tests	Unit tests enable us to test single methods or functions in our code to make sure that produce the correct output. This is an important measure in order to achieve high quality code.
	Karma (*not on diagram yet*)	We use Karma as a spec runner that runs our unit tests in a variety of browsers. This also integrates with Travis-ci and runs test through a headless browser known as PhathomJS.
	Bower	Bower is a front-end package manager. We wrap Bower in an Adapt-cli (command line interface) that enables developers to quickly download and install Adapt and plugins.
	Plugin-registry	We have our own plugin registry that enables developers to register their plugins (components, extensions, menus or themes). Once registered these

		plugins are available through the adapt-cli by running commands like $ adapt install adapt-contrib-text
	Require JS	RequireJS is an AMD (asynchronous module definition) module loader. It enables us a greater sense of modularity and dependency loading.
	Modularity	Adapt is built upon a modular approach where modules shouldn't talk to each other and instead trigger events. This enables us to have a plugin architecture and smaller modular files.
	Dependencies	The RequireJS optimizer loads all of the Adapt dependencies in the correct order so we don't have dependency collisions or unnecessary script tags in the index.html file.
	jQuery	jQuery is a cross-browser compatible DOM manipulation library. It enables us to write less code whilst working across all the currently supported browsers
	DOM manipulation	DOM manipulation allows us to move or affect DOM elements in the browser.