Workflow OER - update

by Fred de Vries

version 1.1   21 December 2015

Introduction

This document is prepared for Abel Cain of the UNESCO (ICT in Education KSD/CI) and Jane-Frances Agbu of the NOUN OER unit. There were preparations in June and July 2015, followed by a mission to Lagos at the headquarters of the National Open University of Nigeria (NOUN) in the last week of July. After the initial production of OER courses a mission in November 2015 focussed on the MOOC design and the creation of icon-version and podcasts. During the work at a distance and the missions, the issues regarding the publication and distribution of NOUN-courses as OER in open and mobile formats were addressed in cooperation with the newly established OER unit (Jane-Frances Agbu, Yemi Dahunsi, Okechukwu Okafor).

This document covers the transforming of existing NOUN-courses into OER-courses to be made available in open formats for academic re-use, mobile formats for smartphones and tablets of students and electronic format for self-print by students. For that purpose a specific template with instructions for its use and advises has been prepared. The workflow and all the production-details have been tuned and updated in this document based on the experience in the 2nd half of 2015.

This document is describing the current and new situation and the organisation of the OER-unit, followed by an explanation of the five main steps in the realisation of the OER-courses. After that the follow-up in January 2015 is described.

Current situation

The NOUN has since its start 13 years ago taken the, at the time, usual approach in creating printed self-study materials for all its courses. Most of the courses are written by NOUN academics or by commissioned academics of other universities. The rights of the materials are with NOUN. In the last years an online platform named iLearn has been introduced in which interactions between students and staff are handled, including the handing in of assignments and feedback. Students enrolling in NOUN-courses can obtain printed copies of their course-materials from the study-centres in the country. As students may not always find the course-books available on their visit to a study-centre, alternative channels developed. Print shops provide against cost copies of existing course-books. The NOUN actually stimulates this, as all the course-books are available as downloadable PDF-files in their original print-format. Since the first courses of NOUN was published a standard instructional design of the course-books has been in use and is applied by the academics with the support of DIRD for the creating of professional printed books. Word is used as the main production-tool without using the automated styling and formatting options the software has build in.

New situation

With the embracing of an OER-policy, supported by the UNESCO, the current practice of making the NOUN courses available 'for free' through the Internet can be elevated. This is to be addressed professionally by adhering to the OER-policy and checking existing course-materials for proper re-use and explaining the effects of OER to students, academics and policymakers. The sharing and re-use of NOUN-courses is to be accommodated by updating the production and delivery mechanism, making courses available in an open format for academic re-use, a mobile format for smartphones and laptops of students and PDF-format for self-print by students. For this purpose, all the existing courses that are to be re-published as OER, have to be reformatted using a structured template reflecting the original instructional design, that allows for the creation of the formats mentioned. All the courses to be published as OER are checked for improper re-use and lack of references. The latter is to become part of a new university wide quality system.

After reworking all the courses it is relatively simple to make updates to the instructional design and have, as needed, professional printed course-books generated once more. DIRD can decide to create a new professional printing template enabling the production of printed course-books. For all the courses labelled as OER, the existing PDF-files are removed from the regular website and the new formats are published in the repository on the OER-MOOC portal. New courses of NOUN are to be supported by MOOCs that use the learning-resources available as OER.
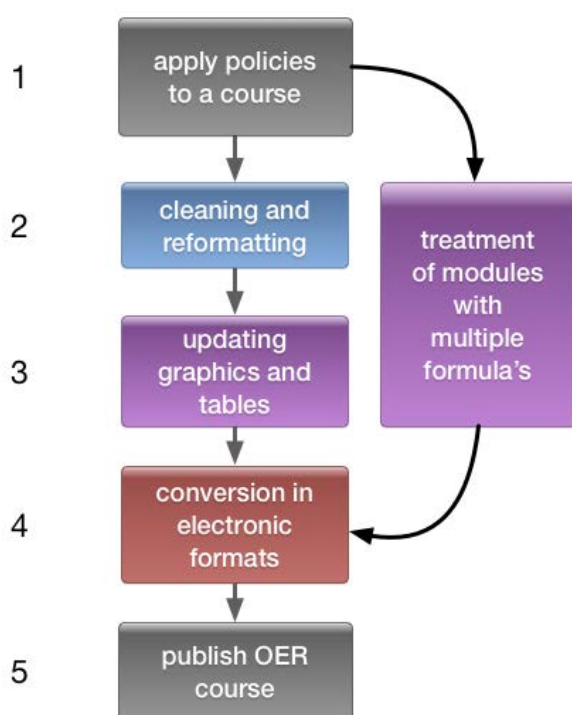
The OER-unit

The OER unit has recently occupied new office-space and has been enlarged with two new staff member dealing with IT and the instructional design. Graphical design capacity is not present in the unit but can be obtained from within the NOUN. The office is suitable for small workshops and walk-in support sessions for academics of NOUN that need help in updating their course-materials for publication as mobile OER. IT facilities have been updated, including the procurement of new laptops with Windows geared with Office 2010 and professional software for the generation of eBooks and PDF-documents. Access, through a reliable internet-connection, to a hosted repository for the archived and published courses is implemented. Ideally the resources are to be tested on smartphones and tablets using Android and Blackberry. It is not urgent to have dedicated devices in the unit as all the publications, can be tested with devices staff-members have or with emulators on personal computers running Windows and IOS. In the 4th quarter additional facilities for the recording of video-presentations as part of the MOOCs to be launched in the 1st quarter of 2016 completed the facilities of the unit

The OUR unit has a pivotal role in the innovation of the university by sensitizing, training and including key stakeholders, DIRD and the ICT-department, in the modernisation of the course-production process. Many academics in the schools of NOUN are curious and eager to update their courses for use as mobile OER. These are the early adopters that need to be cherished. Currently we are working with existing courses of NOUN. Further steps in innovating the course-designs in NOUN are being taken in cooperation with DIRD to publish new and revised courses in OER using the newly designed templates including the broadening of the workflow towards professional printing.

Workflow for mobile OER course books

The workflow for the creation of Mobile OER course books consists of the following 5 steps. In step 1 the course materials are checked against the applicable policies. This includes texts, graphics and references. In step 2 the existing formatting and all the unnecessary textual elements like spaces, line-breaks, page-breaks, tabs etc. are removed after which the document is reformatted using the OER base template. In step 3 all the existing images and tables are examined and preferable replaced by improved ones. If that is not possible, the existing images are captured. For courses with a lot of mathematical formula's steps 2 and 3 are combined by having the course writer use LaTex to compile his course including all the necessary formatting. That LaTeX document is converted in step 4. With dedicated software the OER re-useable version, the eBook version and the self-printable electronic version are generated. Finally the new resources are published in the OER repository.

| Microsoft Word (DOCX)	Original Word-files for NOUN internal use, all to be converted in DOCX, as this is the format needed for ePub. The official OER base template and its variations ones are provided in DOTX format.
OpenOffice (ODT)	Reusable versions of the course books for other academics in ODT-format. This format can be opened by the OpenOffice open-source office software from the Apache project.
EPUB3	This is the current version of the industry wide adopted IDPF standard for the distribution of digital publications as eBooks on tablets, eBook-readers, smartphones, laptops, etc. It is provided to be used by NOUN-students for their studies and can attract other learners.

PDF	The portable document format, since 2008 an ISO standard, is used in cases where students cannot or do not want to use ePub on eBook-readers, laptop computers etc. The format is styled for the use on electronic screens and low-resolution self-printing, either at home or in a print shop. It is distinghushed from high-res professional printing with the PDF-format as is customary in NOUN.

The OER courses are provided in different formats for external users. Internally, within NOUN, Word remains the commonly used format. All the original documents are to be stored in a secure repository for access by the OER-unit, DIRD and the course writers in the different schools. The agreed formats and their target audiences are:

In section 4 we will discuss the styling templates assigned to each format and the resulting differences for the chosen formats. The main steps are to be laid out in detail in the following sections.

1 Apply policies to a course

For the publication of any course as an Open Educational Resource the OER policy is applied. It is accessible on the OER portal. As a consequence a dedicated section, including in the CC-BY-SA statement and a reference to the OER repository is included in all the modules to be distributed as OER.
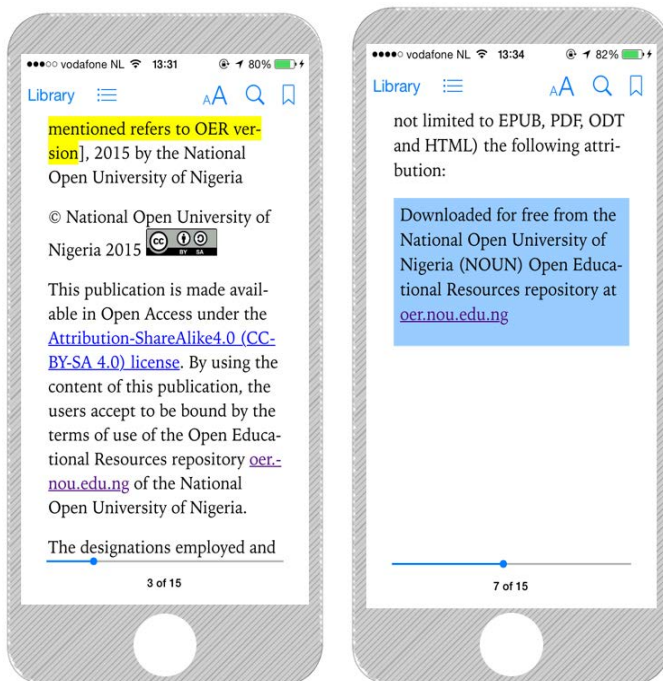
Even more important is the check for improper re-use of existing copyrighted and Open Access contents. Plagiarism software (currently Turn it in) can help indicating texts in the course-materials that need to be examined. As we are dealing with educational materials it is acceptable to quote from texts written by scholars as long as these are properly addressed as such by referring to the

original publication. Models and flow-charts need to be checked manually as the software is not capable of handling images. From the discussions with NOUN academics it can be concluded that the acceptable practices are varying between the schools in NOUN. In one instance it may be acceptable to copy a segment from an open resource like Wikipedia and in another instance this is not. The proper compilation and writing of courses for NOUN, including the prevention of plagiarism, correct quoting of others and literature references goes beyond the scope of the OER project. Therefore the management of the NOUN is advised to workout a university wide plagiarism policy with a dedicated implementation for each school. It is logical to make this part of the responsibility of the newly established Quality-unit.
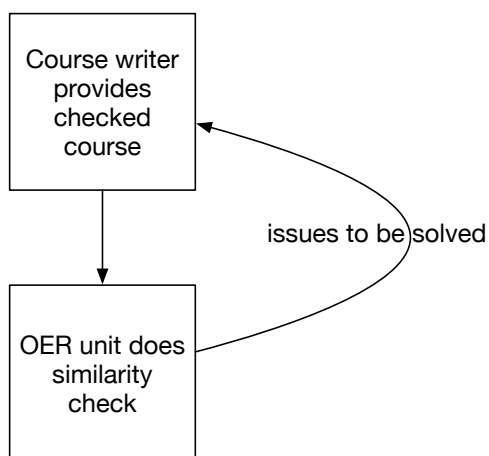
As can be seen in the figure, the issue of improper re-use needs to be dealt with pragmatically with in the scope of the OER-project. If there are too many issues with a specific course it needs to be returned to the course writer for adaptation. The ultimate consequence can be that a course is hold back for some time before its updated version can be published as a mobile OER version.

2 Clean and re-format

As all the courses in their original Word format contain a lot of texts and formatting instructions, which negatively influence the presentation in an eBook, the existing files need to be cleaned up. Each course is dealt with in its original structure, i.e. the existing Modules 1, 2, 3, 4 etc., where the original introduction of each course is labeled Module 0. The reasons for not combining all the modules in one document, but to organize them in modules are:

- eBook versions can have a lot of pages (screens), which can be tedious to navigate through
- to limit the file-size of the eBooks for use on a smartphone
- to enable navigation through each eBook by tables of contents that are not too long.

Using the original course-files a new set of files is created using the eBook base template (available in docx and dotx). This base template will be applied correctly if a blank document is created from the base template.
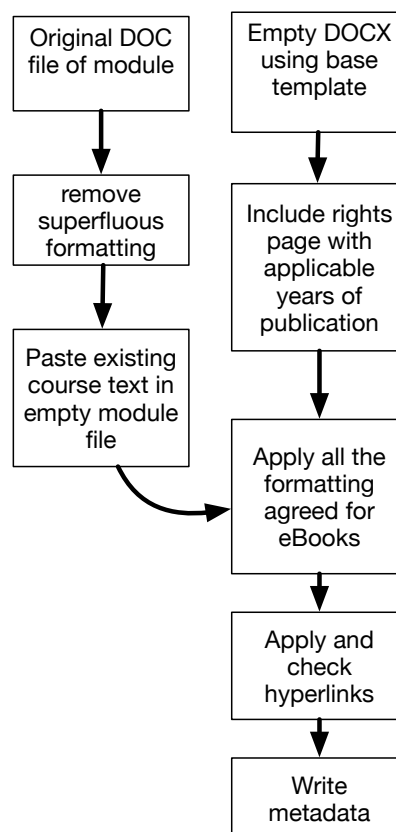
The module to be converted is then to be copied into the new file with the command 'paste and match formatting'. The whole text will in this case adopt the *normal* style. Headings and titles and the other new formatting instructions can be applied while browsing through the document.

Besides this the headings of the different sections need to be marked with the standard formatting instructions of Word; *Book title, Heading 1, Heading 2, Heading 3, Heading 4, Title, Normal, Header, Footer*. These instructions are interpreted in the conversion-process for the creation of an automated table of contents for the eBook-versions enabling the student to navigate through the publication.

2.1 Clean existing course modules

As the flow of the paragraphs in a document, the 'page / screen breaks' and the use of space, are controlled by the eBook software on the device, so all the superfluous formatting needs to be removed.

1. Never use more than one space between words.
2. The use of tabs is forbidden, all the text need to be formatted on the left side and formatting can be applied by scalable simple tables (see section 3)
3. Use to close each paragraph or title only one <return> ↵ , never more.
4. Use one single page-break just before starting a new unit in a module.
5. Use only special symbols that are in the base collection of the Unicode font.
6. Keep the formatting of the paragraphs aligned left, do not align these on the right side or justify the text. Only in exceptional cases, for example when quoting someone, the text may be centered.
7. All tables need to be set as scalable, without fixed heights and weights of cells. Tables may be too large for an eBook-reader, how to handle this is discussed in section 3.

After the cleaning of an existing document the OER base template is to be applied. It has the following effects for ePub and PDF:

Style	ePub for eBook readers	Self-print PDF
Meta-data	The metadata-option called 'properties' of a word-file need to be used as explained under this table, in order to automatically fill the metadata of an ePub.	Idem
Cover page	The cover needs to be a vertical rectangle-shaped artwork with an height/width dimension of 1.6 (1300 x 2100 pixels). The cover will be scaled to the size of the eBook reader	For full-screen visibility it is to be maximized within the A4 page margins.
Book title	Each module / ePub has on the screen after the cover only once the style <Book title> that consists of A000, the course title, Module 0, name of the module followed by listing the course team	idem
Table of contents	There is no table of contents generated in Word, as the ePub software generates these automatically as a navigation menu.	For the self-print PDF a table of contents is to be created in Word as the PDF software will not take care of this.
Rights section	This section is always included and lists the publication-years of previous versions of a course, closing with the current year of publication.	Idem
The font applied is Gill Sans MT	eBook software can force the use of a built in font. Sometimes the user of the device can switch between different screen fonts.	The font is readable on screens and suitable for self-print. Fonts with a serif are more difficult to read on a screen. If necessary an alternative font can be chosen to be included in the PDF-file.
Left aligned paragraphs	Left aligned paragraphs are the easiest to read. eBook software can however force the use of justified text. Sometimes the settings allow for switching between the formatting in the ePub-file and the eBook software.	PDF documents are following the original lay-out of a page.
Heading 1, 2, 3	In a module each unit has a <heading 1>, its chapters <heading 2> and sub-chapters	Idem

Style	ePub for eBook readers	Self-print PDF
	<heading 3>. These will be reflected in the navigation menu of each Module in eBook format	
Title, Heading 4	The additional styles <Title> with the same weight as <heading 3> can be used for additional titles that are not showing up in the navigation menu, like self-assessment questions and answers. Use <heading 4> wisely as it creates 4.3.2.1 titles. Its hyperlink will be available in the menu.	Not applicable
Header	The header consists of course code A000 and the word " Module #' where # is to be replaced by its number or name. The header is short so it will in most cases be presented on the top of the screen of the eBook reader	The text of the header will show on each page. If necessary it show the name of the module or course in full.
Footer	The footer will not be visible. The copyright information can be found in front of the first unit of each ePub-file.	The footer with the text *'downloaded for free as an Open Educational Resource at oer.nou.edu.ng'* will show.
Captions	Use the style <caption> for captions of figures and tables	Idem
Lists	Bulleted and numbered lists can be used without indentation and aligned to the left. Use only the standard bullet • or Latin numbers 1, 2, 3, 4.	Idem
APA references	These are to be formatted using the <normal> style. The <italics> are manually added.	Idem

2.2 Update and include hyperlinks

Another step of this phase includes the check of all external hyperlinks in a module, as external links may not be functioning always. It is advised to setup an Internet service that allows for URI's (Uniform Resource Identifier) in the course-documents replacing the commonly used URL's (Uniform Resource Locator). If applied, the course writer can maintain tables with external references without renewing the OER-files that are in use by students and academics. This can look like

Reference	URL	URI (example)
CTA IFT (2009). *Teacher Driven Change*	www.teacherdrivenchange.org	http://uri.nou.edu.ng/0435
Edutech Wiki (2009). *Incidental Learning*	www.edutechwiki.unige.ch	http://uri.nou.edu.ng/0436

Internal hyperlinks are to be applied if in the text a reference is made to another section in the same module. The common example for NOUN courses include self-study questions for which a link is provided with the answers in the same document. From the answer a link back to the question needs to be provided. With the splitting of a course in an ePub-file for each module, references to other modules can only be made in writing and not via hyperlinks.

2.3 Apply metadata

As mentioned in the previous section, the metadata of a module need to be provided in Microsoft Word using the option 'properties' of a word-file. All the information needed for processing the ePub and PDF can be written in the window 'summary':

In order to link the different modules of a course together the course code A000, the module number M1 and the title of the module are listed under title, where the title of the whole course is mentioned under subject. Please note that courses are to be categorized under ' author' by the names of the NOUN school that publishes them and not by the authors of a course. Keywords can be provided optionally. This will be advantageous once all the courses of NOUN are published in a searchable repository.

2.3 Instructional re-design of course book for eBook use

The essential steps for cleaning the existing course documents have been discussed. Still some re-designing can improve the readability of the eBook and its use for instructional purposes

As reading through the lines from a small screen requires more attention than reading the same text on paper, it is recommended to add structure and pointers for a pleasant experience. After all 'white space' in an eBook is free and we can give the student's eyes a break.

For example a paragraph of 15-20 lines on paper is still readable, where the same lines in an eBook fill up the screen completely. That is why it is a good idea to provide extra pointers like the bold text ' Language and literature' at the top of the paragraph and split the paragraph.
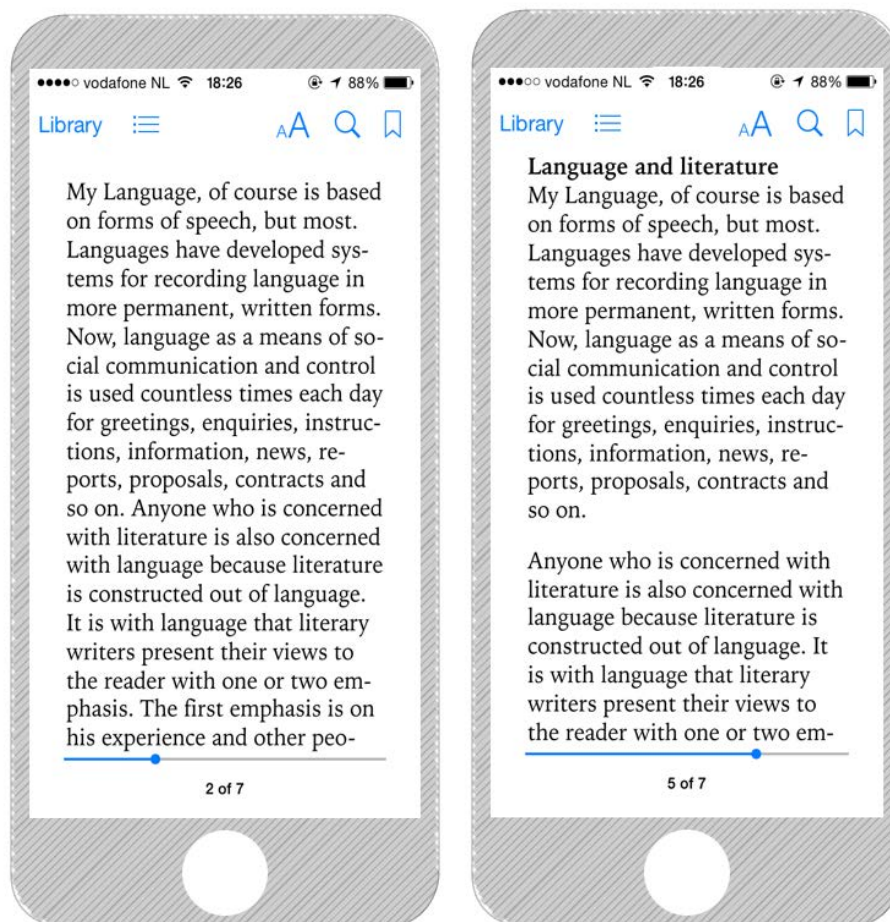
Each course has a Module 0 with the course introduction giving general guidelines on what the student can expect while studying that particular course at NOUN. The eBook files provided to the

students can be annotated by the student with his own notes. That practice can be encouraged in module 0.

3 Updating graphics and tables

Most of the simple graphics and tables in the course books have been designed and drawn by their original authors using the built in capabilities of Word, including the so-called Word-Art. Most of these graphics are not fit for an eBook for the following reasons:

- graphic has an unsuitable resolution,
- table or graphic is too big or too broad to be presented on a narrow screen,
- table or graphic is not scalable .
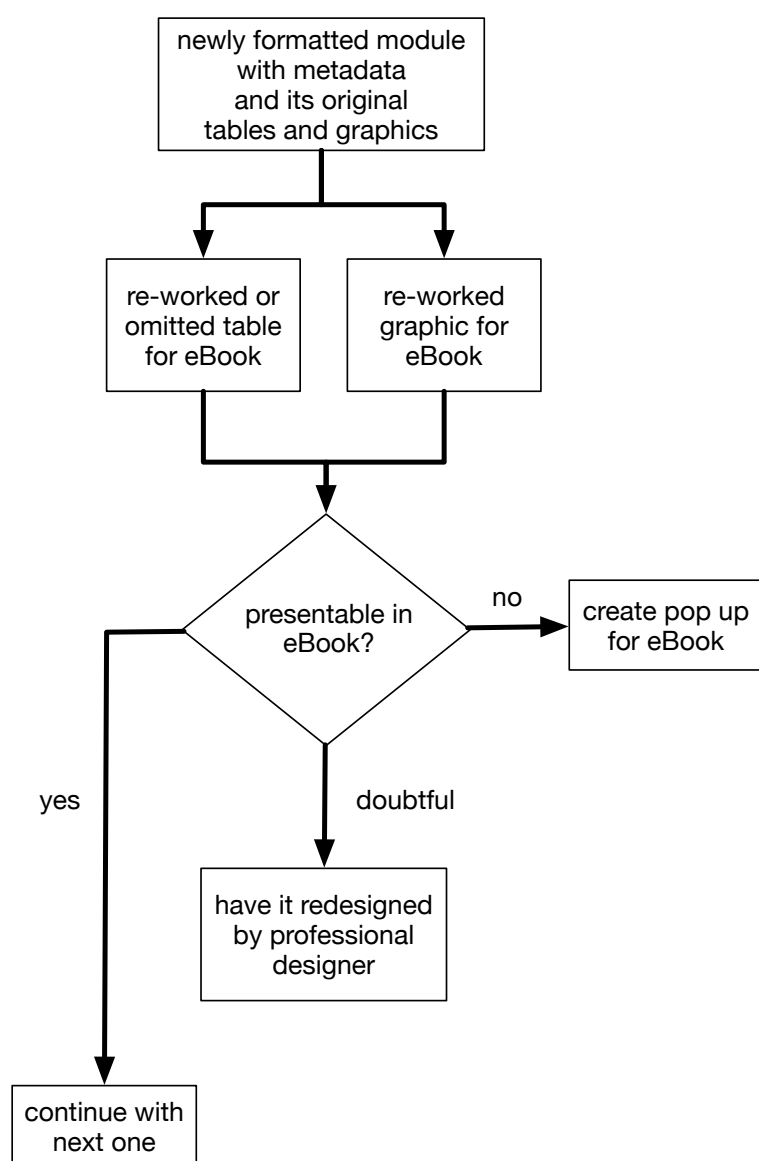
Ideally all the tables and graphics are re-designed by a professional graphic designer. Given the number of tables and graphics present in the NOUN courses this is not feasible. That is why a two-step approach is suggested, where their authors and the OER unit rework the original tables and graphics. All tables and graphics are checked. Many tables are too big for an ePub. Usually this can be solved by splitting up the table in multiple tables or omit the table and present the information in text. Graphics are checked on a case-by-case basis and are ideally re-worked in a similar fashion as the original using software able to create simple and straight-forward vector drawings.

In some cases the original image needs to stay intact, like for example an old map of Africa or the periodic table. In these cases the original image is kept and presented as a pop-up in the eBook-version and a full-screen

image in the self-printable PDF-version. If no suitable graphic or table can be put together that is presentable in an eBook, we move to the second step and have it fully redesigned by a professional graphic designer.

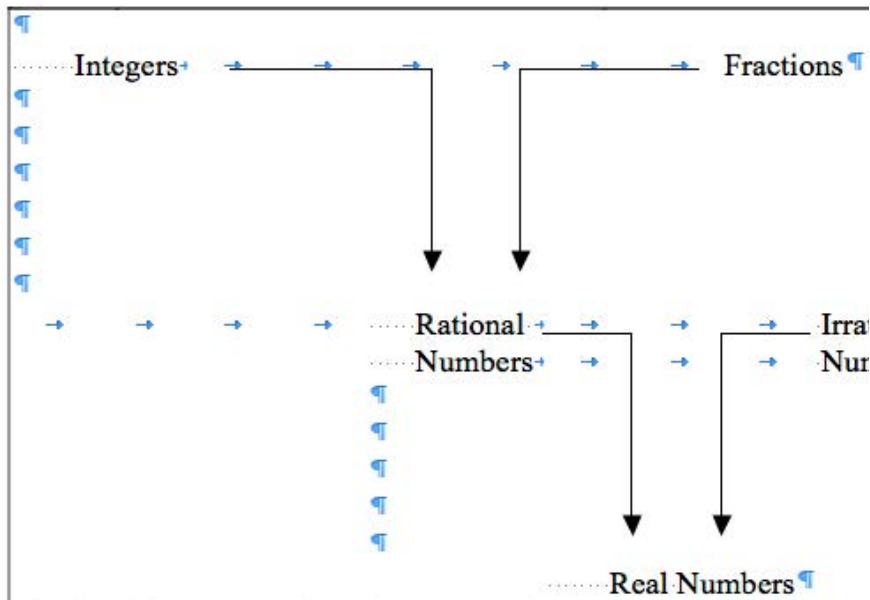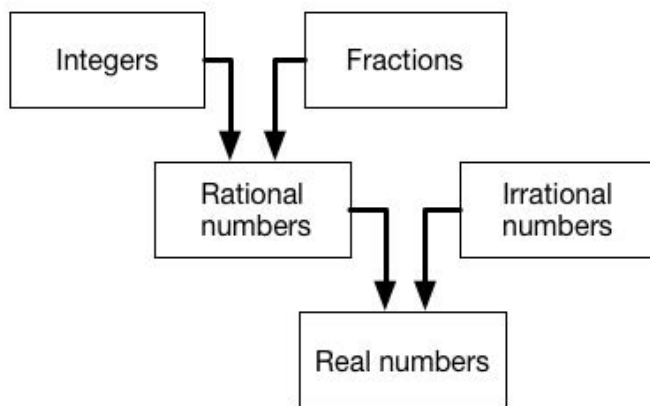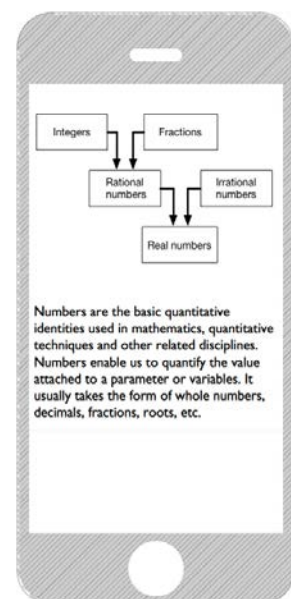Take a look at the following example.

Fig. 1.1: Summary of the Structure of the Real-Number System

The original has been created using tabs, spaces and Word's built in arrows. The reworked one is an image that is narrower to present it on small smartphone screens. For this purpose the image is created with vector-drawing software and saved as an EPS-file, so the image itself is scalable to the narrow screen margins. Please note also that each table or graphic needs to have a page-break just before it to force the eBook reader to present it on a new screen.

Considering the use and creation of graphics, the following issues need to be considered.

characteristics	photo or scan	table	drawing
size	Preferable are standing pictures with resolution of 200 dpi in sizes smaller than A4 pages. Low-res fax images are not suitable	Limit the number of columns and make the table fit to window using Word	Create scalable drawings using vector imaging software and import low res tiff images in Word
resolution	If an EPS picture cannot be created, use for images and photo's PNG or JPG in 200 dpi in RGB color mode or b/w. This is a middle ground suiting small eBook screens, bigger laptop screens and self-print PDF's and thus prevents the creation of two versions of each course i.e. an ePub and a PDF.	n.a.	
positioning to make image show on one screen	For large pictures place a page-break just before it. Very large original work may be coded as a pop-out using ePub functionality	A page-break may help, but a table can flow over multiple pages or alternatively split in multiple tables	For large drawings place a page-break just before it.
color	Color pictures are attractive on a smartphone but are not presented well on a device with electronic ink. Color photo's with a good contrast can be used both on screens and in self-print	Color can be used to highlight some words or arrows instead of using bold text.	Color can be used for clarification and attractiveness
text	Place as much as possible text in the	Place as much as possible short	Text is created with the vector imaging

	caption of the photo	'telegram style' texts in each cell without adding formatting in that cell. The text can be centered	software and needs to be short and in the same font as the running text of the documents.

3.1 Mathematical formula's

Course modules with multiple formulas require a different treatment. What is feasible depends on original preparation of the course files. Ideally the course is written using LaTex, which supports the exact coding and presentation of mathematical formulas. To do this accurately both knowledge of the formula's as well as experience with the use of LaTex is needed. This responsibility lies with the academics and the school in which they are operating. The OER unit supports course books coded LaTex as it is basically a mark-up language that can be converted into XHTML. ePub-software can interpret the XHTML files. So LaTex is very suitable for the creation of ePub output, if a whole course is written with LaTex software.

In the conversion to XHTML the styles promoted for Word, including the margins flow of chapters and the generation of a table of contents is to be applied with specific LaTex commands.

Only a few courses in NOUN are completely written in LaTex. The courses in which the Equation editor in Word is used need to be handled manually. All Word-art formulas are to be screen-captured manually like with other graphics that cannot be newly created. In this process the narrow screens of eBook devices need to be taken into account. Formula's which normally use the whole width of a page; need to be cut in two or three to be presentable. In the following example with matrices created in the Word Equation Editor, matrices A, B, C , D E and F split from 2 lines into 5 lines, showing the matrices under each other on the screen of a smart-phone.

Examples of matrices are:

$$A = \begin{bmatrix} 2 & 4 & 6 \\ 1 & 3 & 4 \end{bmatrix} B = \begin{bmatrix} 1 \\ 6 \\ 7 \\ x \end{bmatrix} C = \begin{bmatrix} 3 & 0 & 1 \end{bmatrix} D = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

$$E = \begin{bmatrix} a & b, & c, & d, & e \dots & z \\ b & & \dots & & & \vdots \\ \vdots & & \dots & & & b \\ z, & y, & x, & w, & \dots a \end{bmatrix} F = \begin{bmatrix} 4 & 2 \\ 1 & 9 \end{bmatrix} G = \begin{bmatrix} 1 & 5 \\ 9 & 6 \\ 1 & x \end{bmatrix}$$

The number or variables in a **horizontal** line are called **Rows.** while the
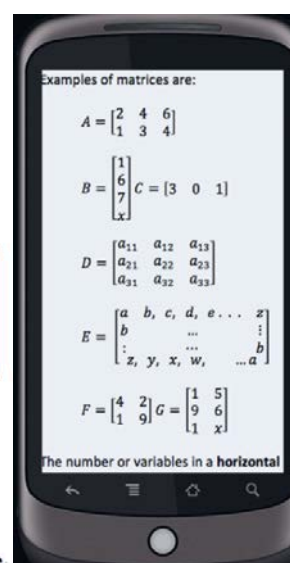
In this way an existing course with mathematical formula's can be transformed in a mobile OER course. Please note that by applying screen-capturing, the formula's are not editable anymore. That's why both version are to be kept; the base version with the original equation editor code and a version with the screen captures. As this is not easy to maintain on the long run, the course writers are advised to consider coding their courses completely in LaTex.

3.2 Use of icons and podcasts

Introducing MOOCs in 2016 the selected course-materials have been enriched with podcasts and instructional icons.

Podcasts have been created using text-to-speech software. It is possible to use eBook apps on smartphones for a conversion on the fly. The results turned out to be sub-optimal as there are no pauses between the different sections and graphics are ignored. For the MOOCs a specific version of the course-file is produced in which the text is adapted for narration. The use of podcasts is attractive for blind and visually impaired students and anyone who want to study while driving a car or travelling by bus. The experimental podcasts can be found in the MOOCs section of the OER-portal.

The existing Word-versions have been updated with icons linked to the important sections and links of the instructional text: Podcasts, Video-presentations, Objectives, Summary, References. This looks like this in a published ePub:
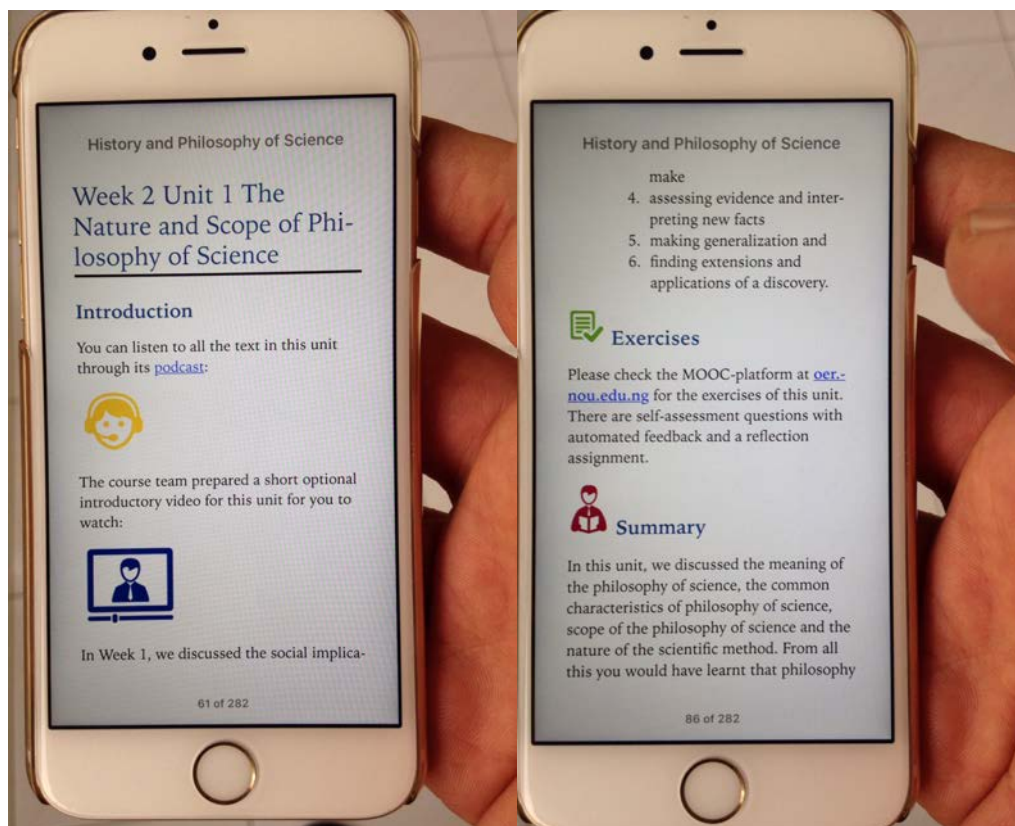
4. Conversion in electronic formats

Given the fact that Word is used almost exclusively for the course-production in NOUN the workflow presented uses as much as possible the built in functions of Word 2010. Tables, flow-charts, graphics, photo's not created in Word are to be kept always with the Word-file they belong to in both their editable format as well as their output format like JPG, PNG and EPS. In the current stage of development at NOUN it is advised not to rely yet on advanced options for the creation of ePub with for example Calibre. Once the production of OER-courses is scaled up and when updating of existing OER courses becomes customary it is usefull to set up a dedicated server with watched folders in which Word-documents are automatically converted into ePub, PDF and ODT and DTP-software like InDesign can be used for the creation of course-designs including the use of icons and podcasts.

	Template use and creation of module files
Microsoft Word (DOCX)	Each module is created using only the OER base template, with the removal of all other styles that are not used. This clean version is the base for all the published output in other formats.
OpenOffice (ODT)	Each module in its base template version is exported as ODT in Word 2010 (or higher version). No editing takes place in the ODT version. They are only checked for compatibility. The base template and the modules contain, as far as known, no formating that is not compatible with ODT. See differences between ODT and DOCS, Microsoft Office.
Images (EPS, PNG, JPG)	All the reworked and redesigned images that are created with software outside Word need to be archived in their original editable format together with the master module files in Word. In order to handle larger collections of text-documents with their assets a naming and versioning logic is to be applied. Please note that this does not apply to tables that are being edited in Word itself. The OER-unit has chosen Inkscape for Windows, that makes it easy to create simple flowcharts and graphics.
EPUB3	The Open Source software Calibre is used by the OER unit for the creation of ePub files. It can be applied with its basic settings, using a generic output format and including the font that is used in the Word base template. Initially ePub files are to be created manually. It is possible to automate this with the application of so called hot-folders. A Word-file with assets that changes is then within minutes automatically converted in ePub
PDF	Adobe Acrobat Pro is used for the creation of PDFs for self-printing. This is also automated with hot folders, where modules of the same course are joined into one PDF-collection. The combination of the Adobe PDF Print Driver and the Adobe PDF maker creates PDF's that have hyperlinks for the table of contents and other links. As mentioned, the PDF-version needs a table of contents created in Word.

	With a macro this task can be executed, after which the new Word-file is not saved for further use. Currently the mobile OER courses are to be created by one base template. It is the possible to apply a second template for PDF publishing that includes the table of contents but has also a different page-layout, spacing use of fonts etc, making it as a fixed format presentation attractive and readable. This derived template is can put into practise after the locking of the base template.
MP3	This compressed file-format is used for the distribution of the podcasts linked to the PDF-versions and ePub-versions of the course-modules. The files are not part of the PDF-files and ePub-files as not all eBook readers support this functionality

5. Publish OER courses

All the courses are published on the NOUN OER –website at http://oer.nou.edu.ng/ for browsing and downloading. For the import in the website the metadata described earlier can be used to prevent any misspelling or other errors. Preferable the modules are being hosted in a repository in which users can search and which can be linked by other OER-initiatives in the world. Such a repository can be harvested in other collections using the OAI-PMH (Open Archives Initiative for Metadata Harvesting) specification of the Open Archives Initiative for Metadata Harvesting) making it easy for academics and students outside Nigeria to find relevant courses.

Bibliographical information with keywords in the metadata will create many more views and downloads of the NOUN OER courses. In combination with the automatic generation of ePub, PDF, ODT, mp3 files the hosting of a repository that automatically updates the published versions of a course is preferred.

Next step

As the use of OER is to be broadened in NOUN by DIRD and the schools developing new courses and course-revisions a handbook based on this document completed with flow-charts is to be worked out and published in January 2016.
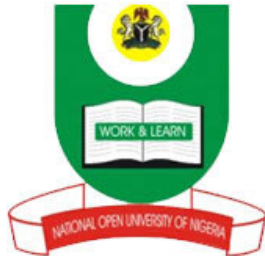
Annex

Base template

The base template v1.1, named **base-template-NOUN-OER-v11** is provided separately as a DOCX and DOTX file to allow for manual copying and pasting of existing contents in the new format and to include it in the templates gallery of Word. The most important information on the introductory

pages is included below. The update from 1.0 to 1.1. involved a change in formulation of the CC-BY-SA license text advised by staff of Creative Commons and adding it specifically to the meta-data of the documents.

National Open University of Nigeria - 14/16 Ahmadu Bello Way, Victoria Island, Lagos, Nigeria

www.nou.edu.ng centralinfo@nou.edu.ng
oer.nou.edu.ng oerunit@noun.edu.ng OER repository

If you redistribute this textbook in a print format, in whole or part, then you must include the information in this section and give on every physical page the following attribution: Downloaded for free as an Open Educational Resource at oer.nou.edu.ng If you electronically redistribute part of this textbook, in whole or part, then you must retain in every digital file (including but not limited to EPUB, PDF, ODT and HTML) the following attribution: