

THE IAFOR HAWAII CONFERENCE SERIES 2017

EDUCATING FOR CHANGE



THE INTERNATIONAL ACADEMIC FORUM PRESENTS

THE IAFOR INTERNATIONAL CONFERENCE ON EDUCATION

THE IAFOR INTERNATIONAL CONFERENCE ON TECHNOLOGY IN THE CLASSROOM

THE IAFOR INTERNATIONAL CONFERENCE ON LANGUAGE LEARNING

THE HAWAII CONVENTION CENTER, HONOLULU, HAWAII, USA

JANUARY 8–10, 2017

“To Open Minds, To Educate Intelligence, To Inform Decisions”

The International Academic Forum provides new perspectives to the thought-leaders and decision-makers of today and tomorrow by offering constructive environments for dialogue and interchange at the intersections of nation, culture, and discipline. Headquartered in Nagoya, Japan, and registered as a Non-Profit Organization (一般社団法人), IAFOR is an independent think tank committed to the deeper understanding of contemporary geo-political transformation, particularly in the Asia Pacific Region.

INTERNATIONAL

INTERCULTURAL

INTERDISCIPLINARY

iafor

The Executive Council of the International Advisory Board

Mr Mitsumasa Aoyama

Director; The Yufuku Gallery, Tokyo, Japan

Lord Charles Bruce

Lord Lieutenant of Fife
Chairman of the Patrons of the National Galleries of Scotland
Trustee of the Historic Scotland Foundation, UK

Professor Donald E. Hall

Herbert J. and Ann L. Siegel Dean
Lehigh University, USA
Former Jackson Distinguished Professor of English and Chair of the Department of English

Professor Arthur Stockwin

Founding Director of the Nissan Institute for Japanese Studies & Emeritus Professor
The University of Oxford UK

Professor Chung-Ying Cheng

Professor of Philosophy, University of Hawai'i at Manoa, USA
Editor-in-Chief, The Journal of Chinese Philosophy

Professor Steve Cornwell

Professor of English and Interdisciplinary Studies,
Osaka Jogakuin University, Osaka, Japan
Osaka Local Conference Chair

Professor A. Robert Lee

Former Professor of English at Nihon University, Tokyo from 1997 to 2011, previously long taught at the University of Kent at Canterbury, UK

Professor Dexter Da Silva

Professor of Educational Psychology, Keisen University, Tokyo, Japan

Professor Georges Depeyrot

Professor and Director of Research & Member of the Board of Trustees
French National Center for Scientific Research (CNRS) & L'Ecole Normale Supérieure, Paris, France

Professor Johannes Moenius

William R. and S. Sue Johnson Endowed Chair of Spatial Economic Analysis and Regional Planning
The University of Redlands School of Business, USA

Professor June Henton

Dean, College of Human Sciences, Auburn University, USA

Professor Michael Hudson

President of The Institute for the Study of Long-Term Economic Trends (ISLET)
Distinguished Research Professor of Economics, The University of Missouri, Kansas City

Professor Koichi Iwabuchi

Professor of Media and Cultural Studies & Director of the Monash Asia Institute, Monash University, Australia

Professor Sue Jackson

Professor of Lifelong Learning and Gender & Pro-Vice Master of Teaching and Learning, Birkbeck, University of London, UK

Professor Sir Geoffrey Lloyd

Senior Scholar in Residence, The Needham Research Institute, Cambridge, UK
Fellow and Former Master, Darwin College, University of Cambridge
Fellow of the British Academy

Professor Keith Miller

Orthwein Endowed Professor for Lifelong Learning in the Science, University of Missouri-St. Louis, USA

Professor Kuniko Miyanaga

Director, Human Potential Institute, Japan
Fellow, Reischauer Institute, Harvard University, USA

Professor Dennis McInerney

Chair Professor of Educational Psychology and Co-Director of the Assessment Research Centre
The Hong Kong Institute of Education, Hong Kong SAR

Professor Brian Daizen Victoria

Professor of English
Fellow of the Oxford Centre for Buddhist Studies

Professor Michiko Nakano

Professor of English & Director of the Distance Learning Center, Waseda University, Tokyo, Japan

Professor Thomas Brian Mooney

Professor of Philosophy
Head of School of Creative Arts and Humanities
Professor of Philosophy and Head of School of Creative Arts and Humanities, Charles Darwin University, Australia

Professor Baden Offord

Professor of Cultural Studies and Human Rights & Co-Director of the Centre for Peace and Social Justice
Southern Cross University, Australia

Professor Frank S. Ravitch

Professor of Law & Walter H. Stowers Chair in Law and Religion, Michigan State University College of Law

Professor Richard Roth

Senior Associate Dean, Medill School of Journalism, Northwestern University, Qatar

Professor Monty P. Satiadarma

Clinical Psychologist and Lecturer in Psychology & Former Dean of the Department of Psychology and Rector of the University, Tarumanagara University, Indonesia

Mr Mohamed Salaheem

Director, The United Nations World Food Programme, Japan & Korea

Mr Lowell Sheppard

Asia Pacific Director, HOPE International Development Agency, Canada/Japan

His Excellency Dr Drago Stambuk

Croatian Ambassador to Brazil, Brazil

Professor Mary Stuart

Vice-Chancellor, The University of Lincoln, UK

Professor Gary Swanson

Distinguished Journalist-in-Residence & Mildred S. Hansen Endowed Chair, The University of Northern Colorado, USA

Professor Jiro Takai

Secretary General of the Asian Association for Social Psychology & Professor of Social Psychology
Graduate School of Education and Human Development, Nagoya University, Japan

Professor Svetlana Ter Minasova

President of the Faculty of Foreign Languages and Area Studies, Lomonosov Moscow State University

Professor Yozo Yokota

Director of the Center for Human Rights Affairs, Japan
Former UN Special Rapporteur on Myanmar

Professor Kensaku Yoshida

Professor of English & Director of the Center for the Teaching of Foreign Languages in General Education, Sophia University, Tokyo, Japan

The IAFOR International Conference on Technology in the Classroom – Hawaii 2017

Official Conference Proceedings

ISSN: 2432-1222

© The International Academic Forum 2017
The International Academic Forum (IAFOR)
Sakae 1-16-26-201
Naka Ward, Nagoya, Aichi
Japan 460-0008
www.iafor.org

Table of Contents

The Use of Application Builder & COMSOL Multiphysics as a Tool to Build and Deploy Simulation Apps for Heat Transfer Teaching

Mohamed Edali

Zaed Sahem

Faraj Ben Rajeb

Sondos Elhsaik

Hanadi Saad

Ali Elkamel

pp. 1 - 19

LePo: An Open-Source Learning Management System with Text Annotation and Content Curation Functions

Koichi Yoshizaki

Hiroshi Hotta

pp. 21 - 28

Using DVDs to Introduce Multimodal Digital Literacy Practices into the Japanese EFL Classroom

Timothy Wayne Pollock

pp. 29 - 42

The Use of Application Builder & COMSOL Multiphysics as a Tool to Build and Deploy Simulation Apps for Heat Transfer Teaching

Mohamed Edali, Department of Chemical and Petroleum Engineering,
Faculty of Engineering, Al-Mergib University, Libya
Zaed Sahem, Ontario Society of Professional Engineers (OSPE), Canada
Faraj Ben Rajeb, Department of Oil and Gas Engineering,
Memorial University, Canada
Sondos Elhsaik, Faculty of Engineering, Al-Mergib University, Libya
Hanadi Saad, Faculty of Engineering, Al-Mergib University, Libya
Ali Elkamel, Department of Chemical Engineering, University of Waterloo, Canada

The IAFOR International Conference on Technology in the Classroom – Hawaii 2017
Official Conference Proceedings

Abstract

For teaching Heat transfer, we currently apply COMSOL Multiphysics software and its new application builder features. Main goals are to maximizing the efficiency of the learning process, expanding the investigation techniques while keeping students engaged. In Engineering based courses as Heat Transfer, simulation apps are helping to strike such a balance by introducing students to complex concepts in a simplified format. In any simulation study, there are complex theories and physics that must be considered in order to obtain accurate, realistic results. Innovative ways that university professors should utilize within the classroom are the use of simulation apps as that they are able to incorporate these elements into the underlying model while hiding such complexities behind a user-friendly interface. Within the university setting, simulation apps are evolving as a powerful tool for introducing students to challenging concepts and enhancing their modeling skills to further advance their learning. We describe the fundamentals and give examples of exercises that include several features of the modelling options. The user-friendly design of COMSOL makes the software well-suited for use in the class-room for both the above-mentioned purposes. The students benefit from the easy handling of model input, which is completely performed within the graphical user interface.

Keywords: Heat transfer and transport, Multiphysics, COMSOL Application builder.

iafor

The International Academic Forum
www.iafor.org

Introduction

1. Heat Transfer Principles

Temperature is considered a common property in physics science and is used to define the hot and cold mediums and boundaries. In microphysics scale principle, the temperature refers to molecular motion intensity [1]. As per Holman's [2], energy movements occur when there is temperature variance between mediums and boundaries. To estimate the energy movements, applying heat transfer science theories and laws is needed. This energy transfer always happens from the hotter medium to the colder one.

Heat transfer has many applications in engineering fields such as chemical engineering, mechanical engineering, civil engineering, biomedical engineering and electronics engineering. The main objectives of heat transfer research are: 1) better energy transfer by increasing heat transfer rate, 2) better insulation by decreasing heat transfer, 3) maintaining the temperature value in specified range.

Heat transfer between mediums has three ways: conduction, convection and radiation. Regards to the study of heat transfer; it is divided into these three parts in this study as:

1.1 Conduction Heat Transfer

Conductive heat transfer is occurring in solid bodies such as metals and walls where heat transfer energy moves from the higher temperature side to the less temperature side. This can be demonstrated in molecular scale, where the higher energy atom due high temperature value collides with the less energy neighboring atom and as a result of this vibrated collision the heat energy will transfer from one side to another [3].

The simple governing equation for steady state conduction heat transfer which is known as Fourier's law of heat conduction is depending on temperature deference, thickness, cross sectional area and material conductivity as follow:

$$q = -kA \frac{dT}{dx} \quad (1)$$

Where:

q is the heat-transfer rate, Watt (W)

A is cross-sectional area, square meter (m^2)

k is the thermal conductivity of the material, W/ (m.K)

dT/dx is the temperature gradient, (K/m)

Transient Heat Conduction

Conservation of energy and the Fourier's law are playing an important role in governing the transient heat conduction, where the heat energy balance can be illustrated in this equation [3]:

$$[\text{Energy conducted from outside of the medium}] + [\text{Heat generated within medium}] = [\text{Energy conducted to outside of the medium}] + [\text{Change in internal energy within medium}]$$

This heat diffusion equation can be derived in Cartesian format as following.

$$\frac{\partial}{\partial x} \left(k \frac{\partial T}{\partial x} \right) + \frac{\partial}{\partial y} \left(k \frac{\partial T}{\partial y} \right) + \frac{\partial}{\partial z} \left(k \frac{\partial T}{\partial z} \right) + \dot{q} = \rho c \frac{\partial T}{\partial t} \quad (2)$$

Where

ρ is density, kg/m³

c is the specific heat of material, J/kg. K

\dot{q} is the heat generated per unit volume, W/m³

1.2 Convection Heat Transfer

Convective heat transfer is the second form of moving the energy from the hot region to the colder region by the movement of a fluid such as liquids and gases [1].

The simple governing equation for convective heat transfer rate is based on the Newton's law of cooling [2]:

$$q = hA\Delta T \quad (3)$$

Where

q is heat-transfer rate, Watt (W)

h is convection heat transfer coefficient, W/ (m². K)

A is area, m²

ΔT is temperature difference between fluid and surface, K

1.3 Radiation Heat Transfer

The Radiative heat transfer is occurring by the mean of electromagnetic waves where the heat source is sending the heat energy away from the emitting source. The solar energy is considered a clear example for the radiative heat transfer [3].

2. Using COMSOL in heat transfer course

Heat transfer has numerous applications in many engineering fields and with the aid computerized tools, certain packages have been used to investigate, analyze and optimize engineering designs. One of these useful numerical softwares is Comsol Multiphysics which is produced by COMSOL group. This package defined as a finite element analysis, solver and simulation software designed for many Multiphysics fields of science and engineering such as electrical, mechanical, Civil, and chemical applications.

The COMSOL is used in heat transfer course to build and deploy numerical simulation APPS. These APPS are designed as a powerful teaching tool, which will be maximizing the efficiency of the learning process and expand the learning horizons for university students. In addition, COMSOL simulation apps will help students to strike such a balance by introducing them to complex concepts in a simplified visualized format.

To use COMSOL Heat Transfer APPS, a necessary step must be prepared first, which is creating a COMSOL Model to simulate heat transfer domain and process through arranged tasks as following:

- Domain shape modeling in 1D, 2D, or 3D.
- Meshing selection from coarse to fine.
- Subdomain and boundary physical properties settings, where each domain's material property, initial conditions are specified in subdomain settings physics menu, and boundary conditions are specified in boundary settings menu.
- Selecting the COMSOL Multiphysics's solver. There are two options for this task by either selecting the default setting or choosing the problem designed solver.

The COMSOL app builder is considered a new add-in feature added to the software as an interactive visualized aid in classroom instruction. Once the teacher prepares the problem model, he or she will be able to design an APP for the problem and allow students to manipulate it and try different scenarios. In the next section, examples of some developed APPS for some heat transfer case studies.

3. Sample of Heat Transfer APPS “Case Studies”

Figure (1) displays a snapshot for a COMSOL App. This simple App was created to study the steady state conductive heat transfer where the total heat flux through a brick wall is calculated based on the one dimensional conductive heat transfer governing equation. The App is designed in a simple way to allow students navigate the two sections of the problem, where the first section is showing the theoretical background and the second section is divided into multiple numerical analysis tabs (Geometry, Meshing, Temperature profile...etc.). Detailed navigation steps are illustrated in section 5.

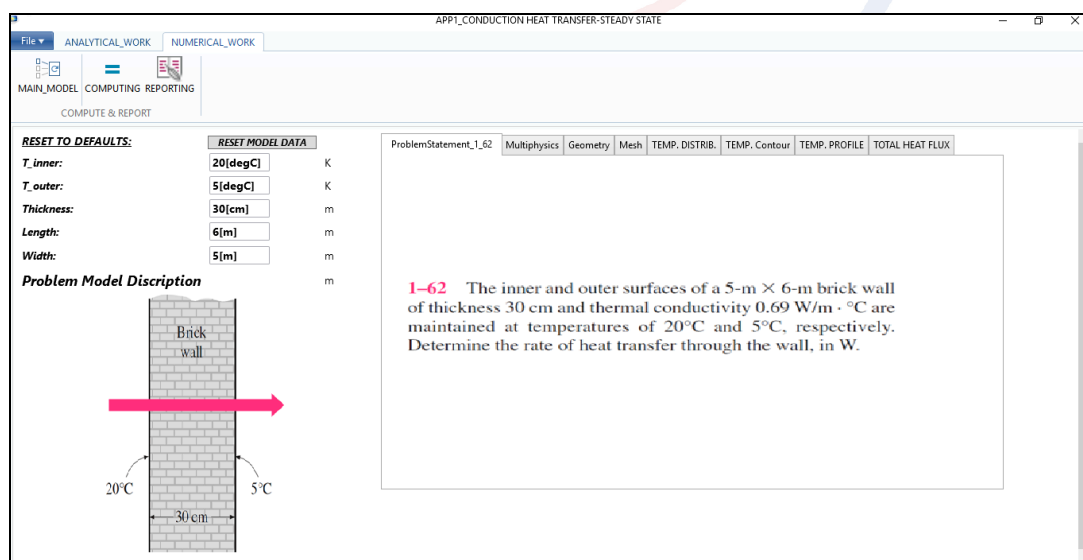


Figure 1: APP-1 snapshot - Solving Conduction Heat Transfer - Steady State case study

APP-2 is presented in figure (2) where a different type of conductive heat transfer is investigated. In this case, change over time “Transient approach” is considered to calculate heat flux loss through a small building roof.

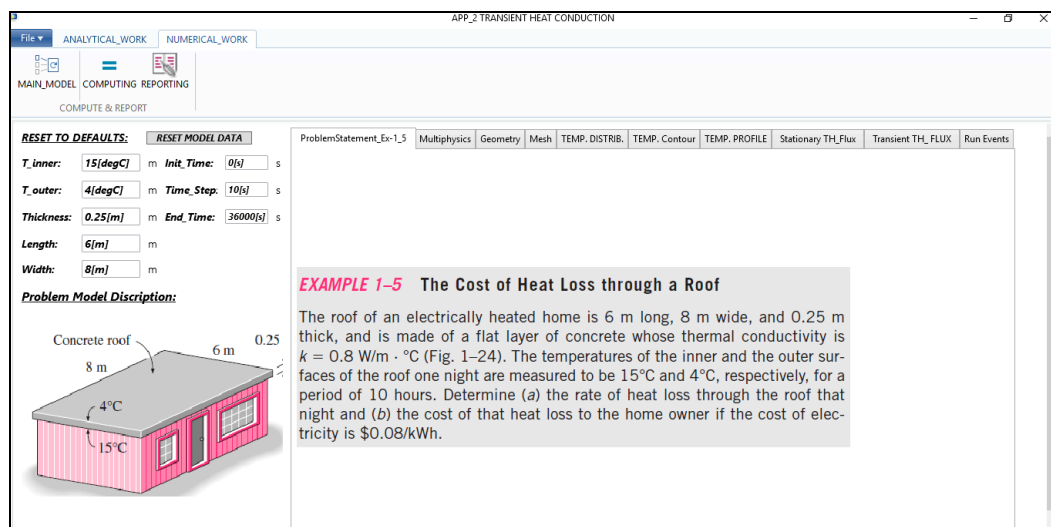


Figure 2: APP-2 snapshot - Solving Conduction Heat Transfer – Transient heat conduction case study

The third sample of using COMSOL Apps in heat transfer course is displayed in figure (3). In this App, two types of heat transfer were covered.

The App is illustrating the combined conductive and convective heat transfer for a case of insulating chamber. The flexibility of the input data section enable student to try different scenarios to find the best way to reach the required insulation needs. In section 6, a detailed investigation for the possible outcome scenarios is presented.

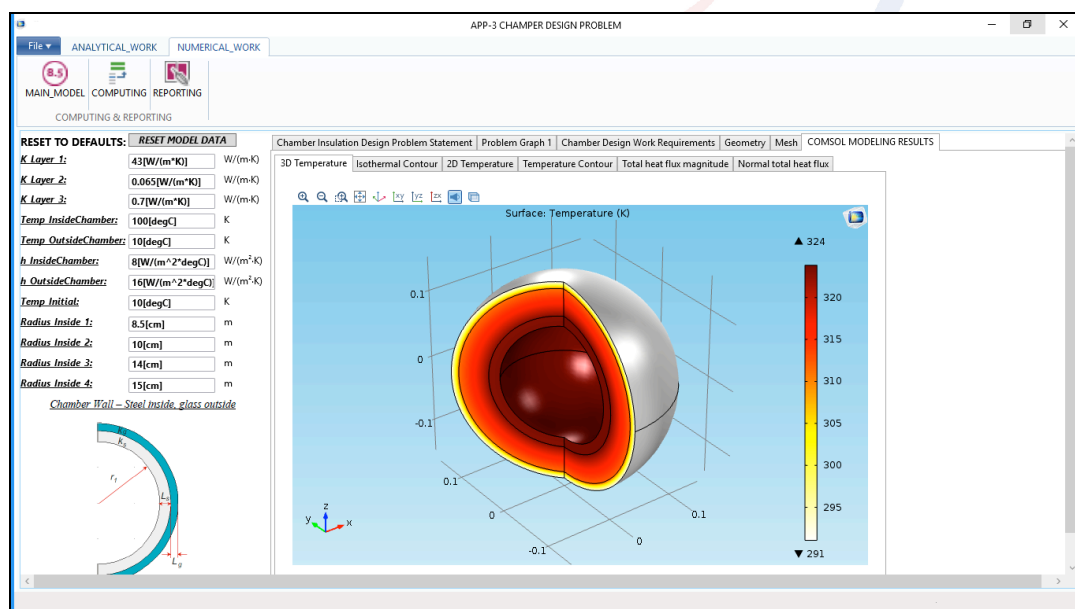


Figure 3: APP-3 snapshot - Solving Conduction/Convection Heat Transfer – Chamber insulation design case study

An oven case study is presented in App 4 as shown in figure (4). The case study is investigating the conductive and convective heat transfer nature.

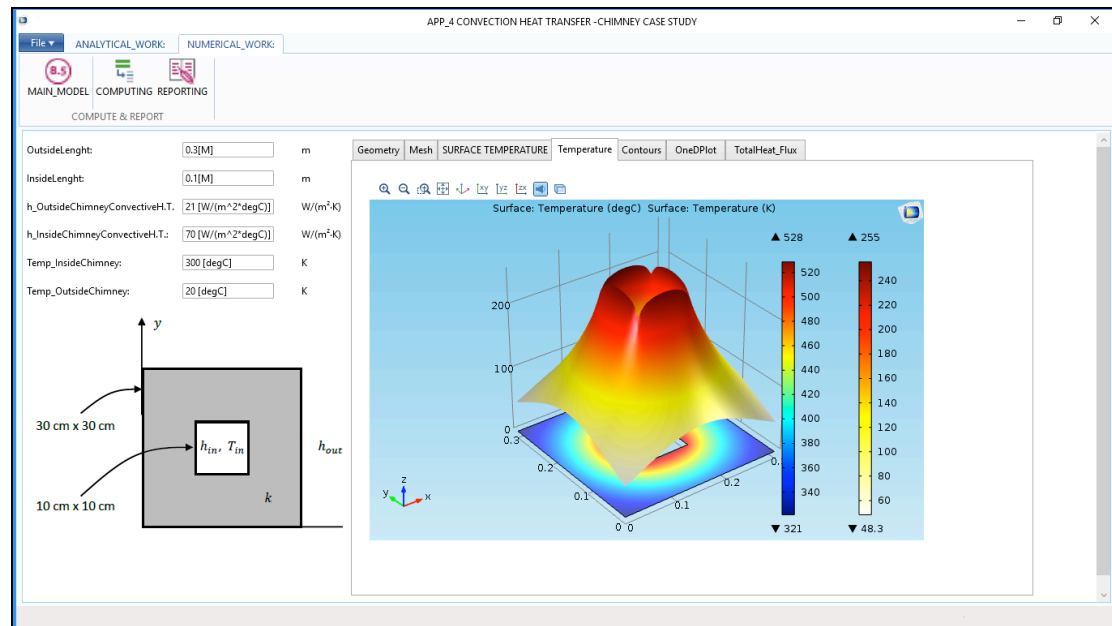


Figure 4: APP-4 snapshot - Solving Conduction/Convection Heat Transfer – Oven heat transfer case study

Another example of using COMSOL Apps in teaching heat transfer is shown in figure (5), where another case of wall insulation is solved based on conductive and convective heat transfer principles.

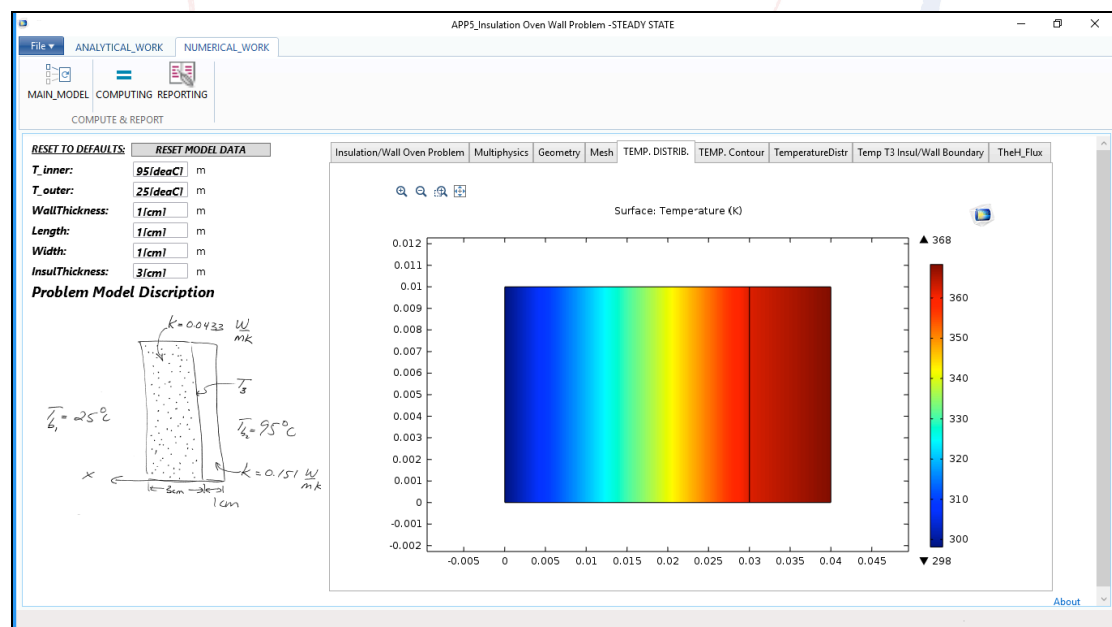


Figure 5: APP-5 snapshot - Solving Conduction/Convection Heat Transfer – Wall insulation case study

One of the main sections in the heat transfer course is studying the radiative heat transfer which has wide range of applications. Figure (6) represents App 6 which was created to study three emissive panels exposed to radiative heat source.



Figure 6: APP-6 snapshot - Solving Radiation Heat Transfer – Three plates case study

4. COMSOL APP Navigation example

To cover all the sides of the simple conductive heat transfer problem, The COMSOL Apps were organized basically into two main dropdown ribbons as presented in the following figures (7) to (19):

- Analytical background works ribbon
- Numerical steps and outcomes ribbon

The analytical work tabs as shown in figure (7) are illustrating the necessary steps that students should perform before starting the numerical work. These steps are sorted as shown in figures (7), (8) and (9).

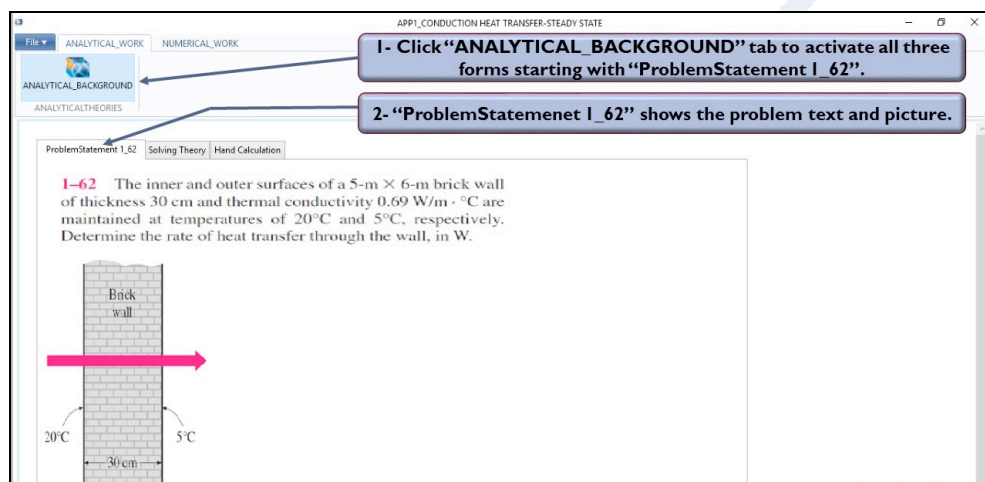


Figure 7: APP-1 navigation snapshot – Analytical background dropdown ribbon components – detailed problem statement tab

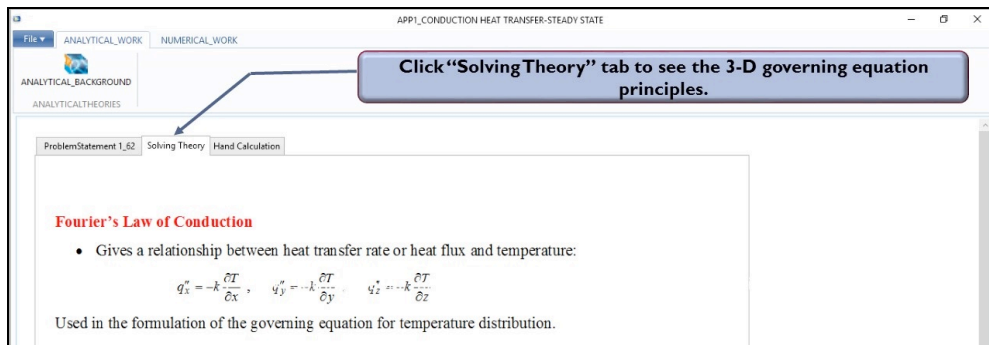


Figure 8: APP-1 navigation snapshot – Analytical background dropdown ribbon components- Solving theory principles

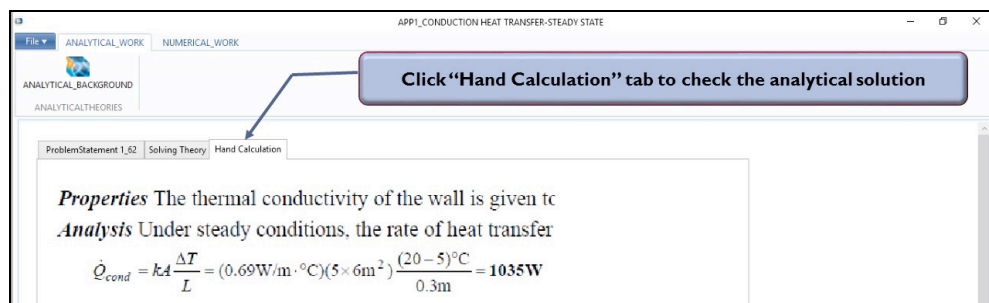


Figure 9: APP-1 navigation snapshot – Analytical background dropdown ribbon components – Formal analytical calculation

Figures (10) to (19) describe the numerical work tabs arrangement. To start the numerical work steps, students should activate all the tabs “forms” associated with the numerical work by clicking the “Main_Model” tab. As shown in figure (10), the first tab on the list for the left side is showing the repeated problem statement, where students can refer to it easily while staying in the numerical interface. In addition, the figure is displaying the input values section which is designed to be visible all the time while navigating the numerical work tabs.

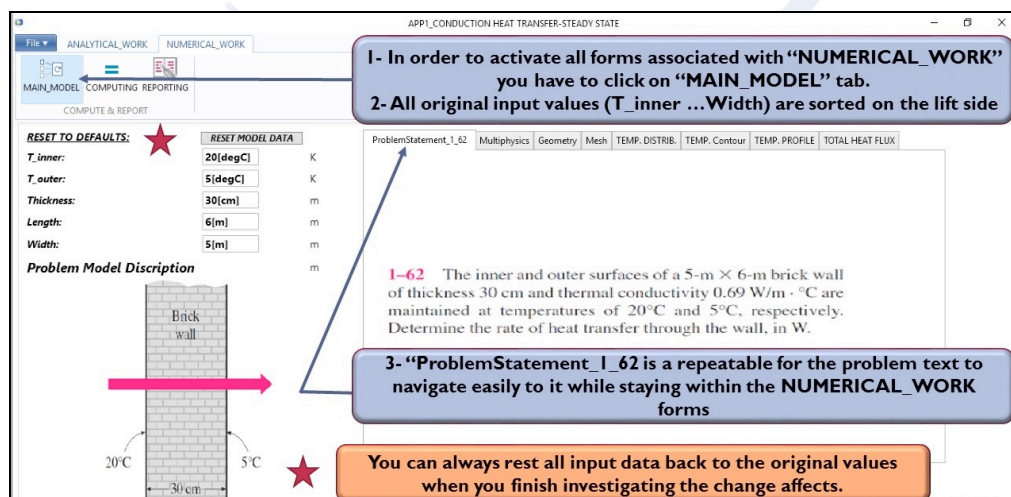


Figure 10: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Activating and inserting problem values

The second tab from the left is displayed in figure (11). This tab is describing the necessary numerical steps such as geometry configuration, meshing visualization... etc.

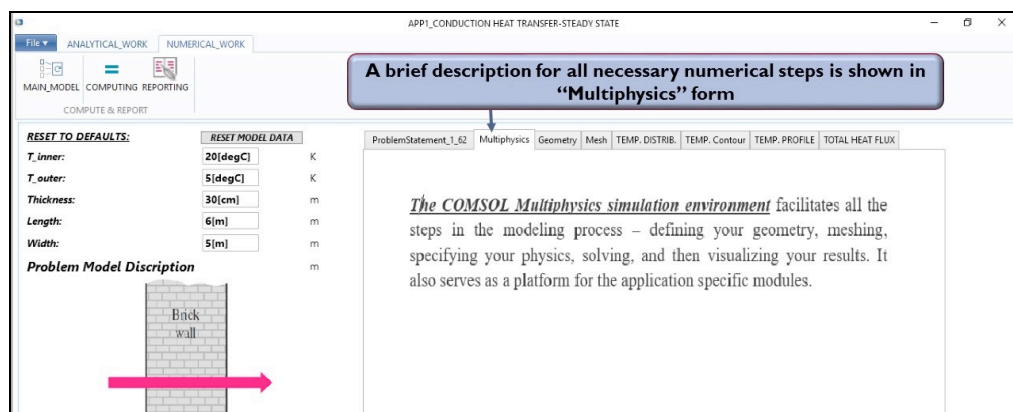


Figure 11: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Multiphysics numerical steps overview

The figure (12) is visualizing the studied geometry in 2-D representation. Noting that both dimensions can be changed from the main control panel.

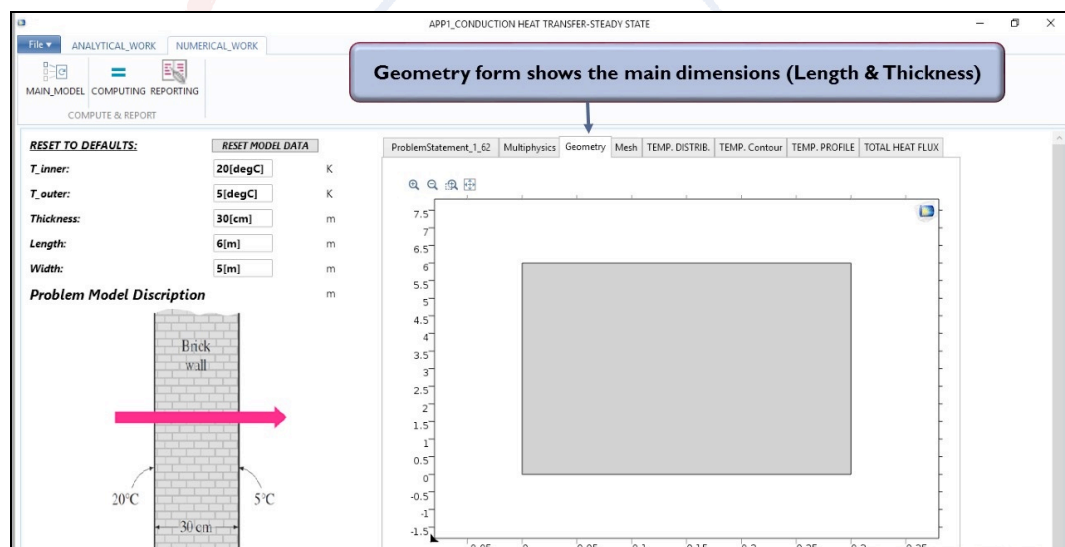


Figure 12: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Geometry configuration and dimensions

Once the geometry is specified in the previous tab, the meshing will be displayed based on the model pre-selection from the coarse meshing grade to the fine meshing grade. The meshing visualization is shown in figure (13)

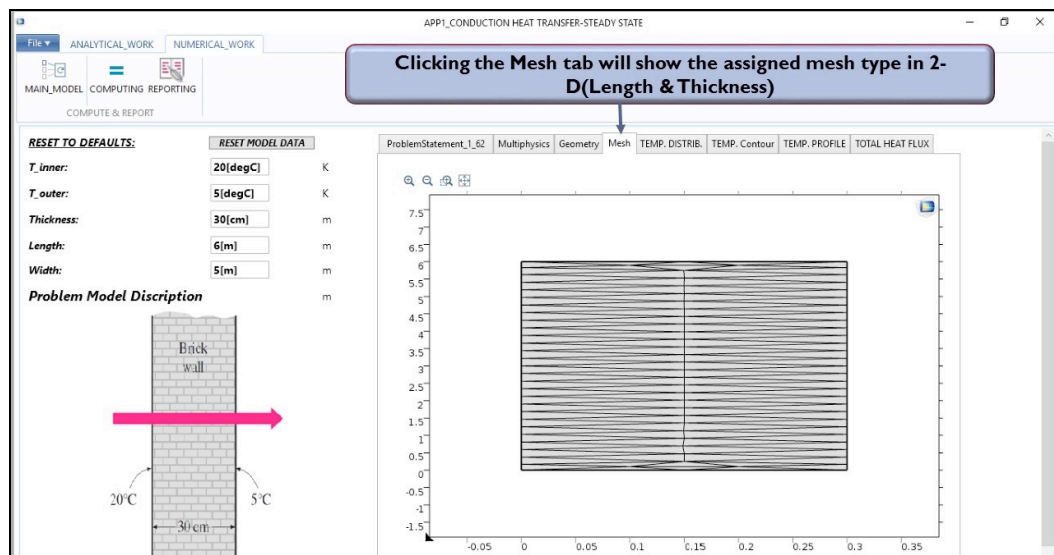


Figure 13: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Meshing visualization tab

The temperature distribution across the geometry is visualized in figure (14) where the gradient color is displaying the temperature values from T-inner value to T-outer value.

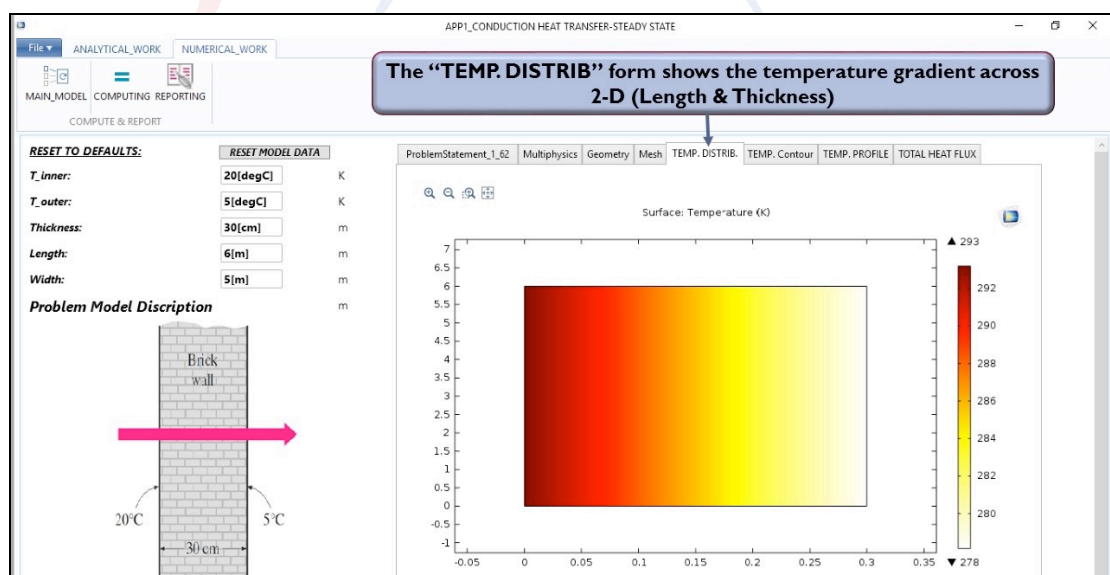


Figure 14: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Temperature distribution across the geometry

Another form of displaying the temperature is shown in figure (15), where the temperature contours is visualized in 2-d (length and thickness).

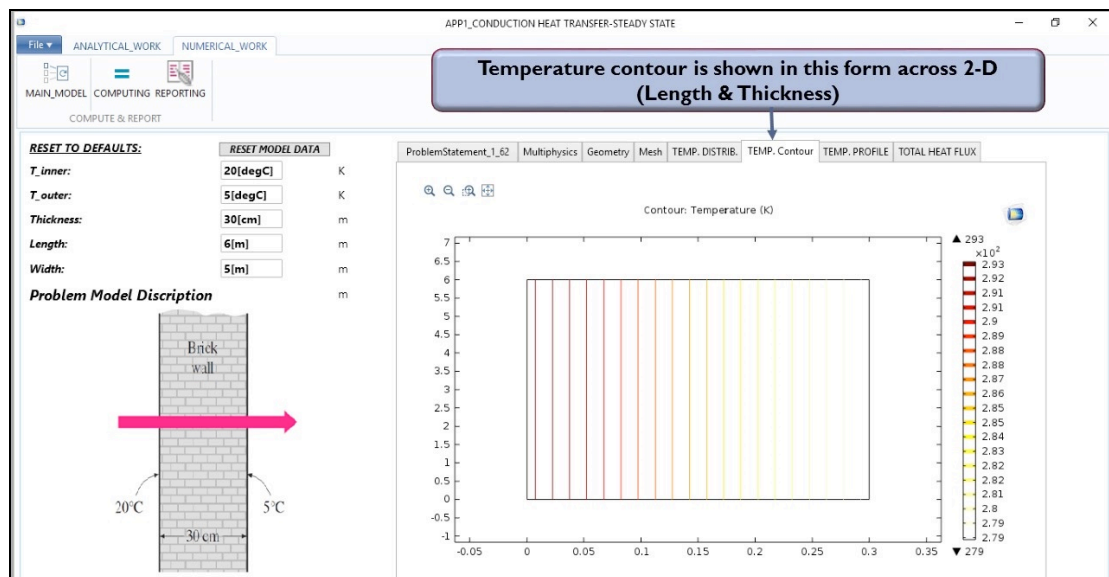


Figure 15: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Temperature contours across the geometry

TEMP. PROFILE tab is displayed in figure (16). This tab is describing the temperature linear function across the wall thickness ranging from the inner temperature in the left side of the graph to the outer temperature in the right side of the graph.

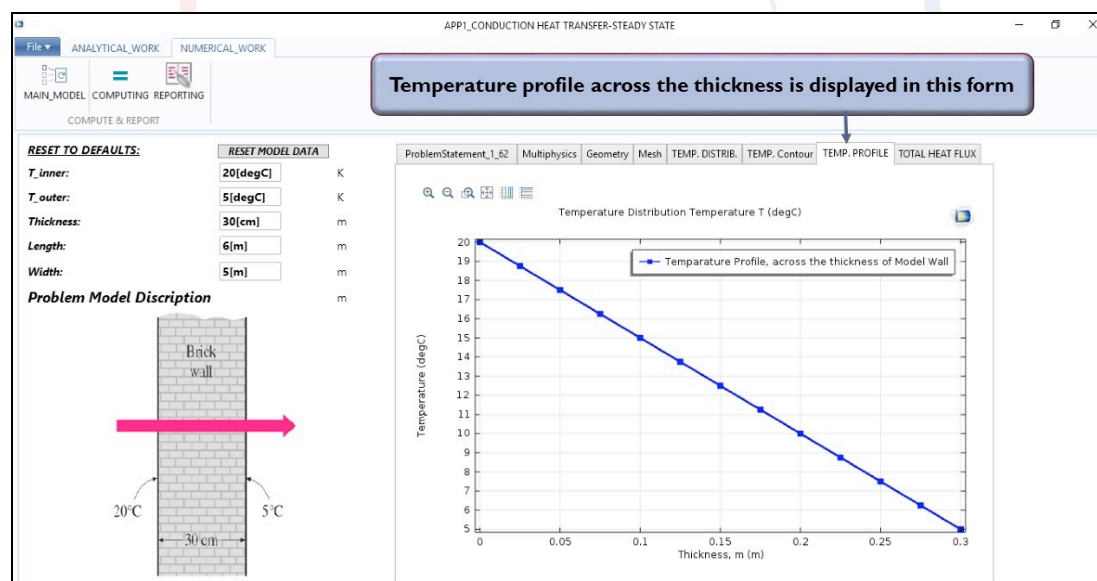


Figure 16: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Temperature profile across the wall thickness

The last tab at the right end in figure (17) is showing the numerical value for the total heat flux loss across the wall thickness. From this tab students, can compare their analytical results with this value and their finding should be within the acceptable value based on the numerical approximation and meshing scale.

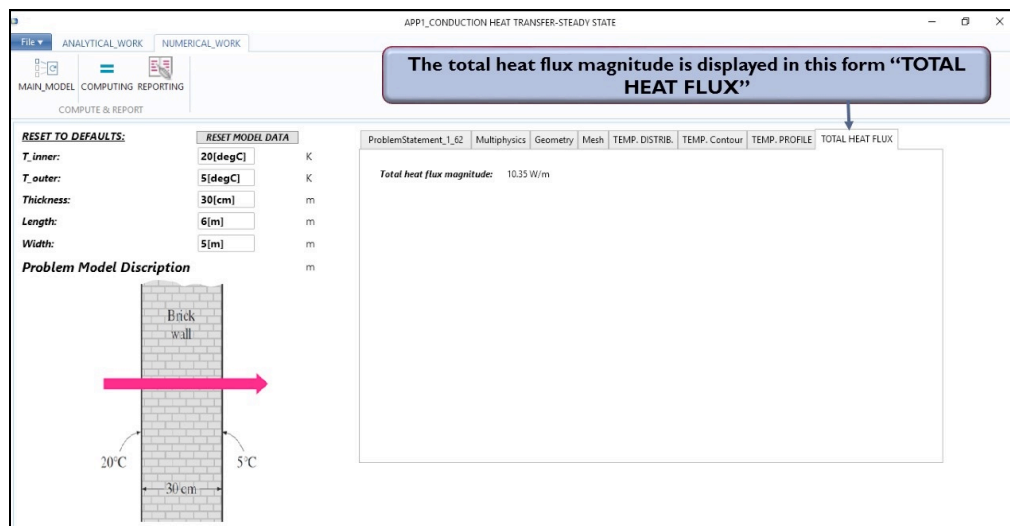


Figure 17: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Total heat flux loss across the wall

Once students apply any changes to the input values they should perform the computing process by clicking the “COMPUTING” tab as described in figure (18). This step will run all the numerical models and give the finish signal “sound tone”.

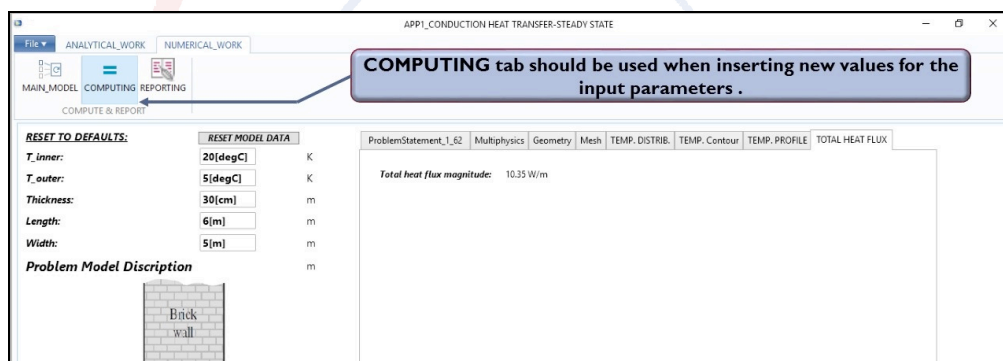


Figure 18: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Numerical computing step

The APP is equipped with a very useful reporting feature as shown in figure (19). By this step, students can extract an editable Microsoft Word file which has pre-arranged report section as displayed in figure (20). The file can be saved later in the desired directory. The produced technical report will have the main sections such as cover page, table of contents, input list, charts and colored plots.

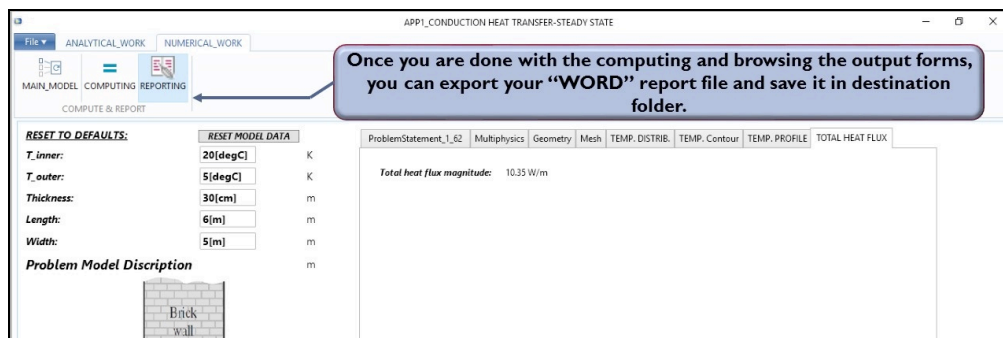


Figure 19: APP-1 navigation snapshot – Numerical work dropdown ribbon components – Extracting the final study report

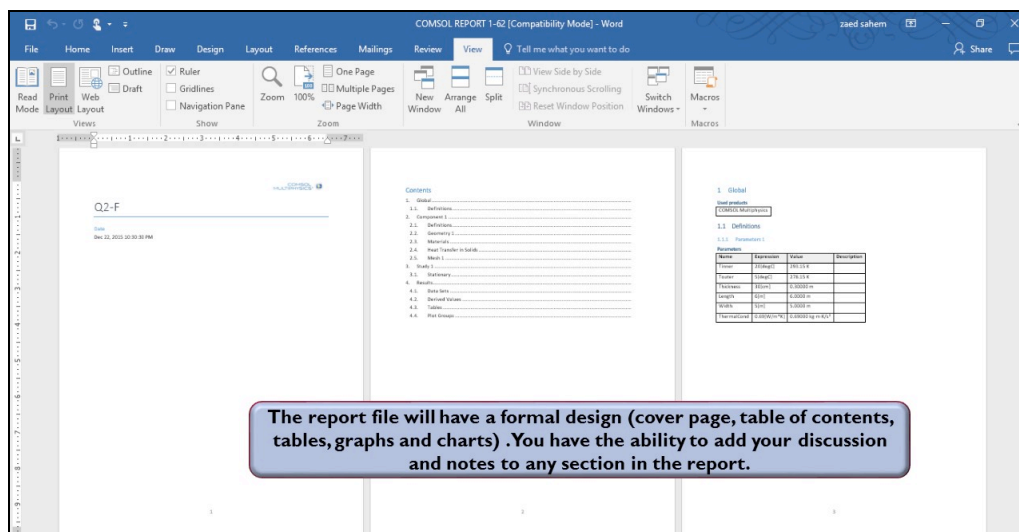


Figure 20: APP-1 editable produced report

5. Results Overview for APP-3 “Chamber insulation design case study - Comparison of case study six possible scenarios”

By implementing any change to the input values, students will be able to see the results of that change. In this section, App-3 is dealing with a case study of finding the best way of insulating a chamber. Therefore, the possible arrangements for the chamber layers are described in the following table as displayed in figure (21). Students can make the adjustments to the layer diameters with some pre-set restrictions

- The inner and outer diameters for the whole set is constant
- The thickness of each layer is kept at constant values
- The inner and outer temperatures are kept at constant values
- The inner and outer convective heat transfer coefficients are constant

Scenario	Inner layer	Mid layer	Outer layer
S1	Steel	Insulation	Glass
S2	Insulation	Steel	Glass
S3	Glass	Insulation	Steel
S4	Glass	Steel	Insulation
S5	Steel	Glass	Insulation
S6	Insulation	Glass	Steel

Figure 21: APP-3 possible problem scenarios (layers arrangement)

The first scenario was arranged as the steel will be in the inner layer and the insulation material in the mid layer and the glass for the outer layer as shown in figure (22)

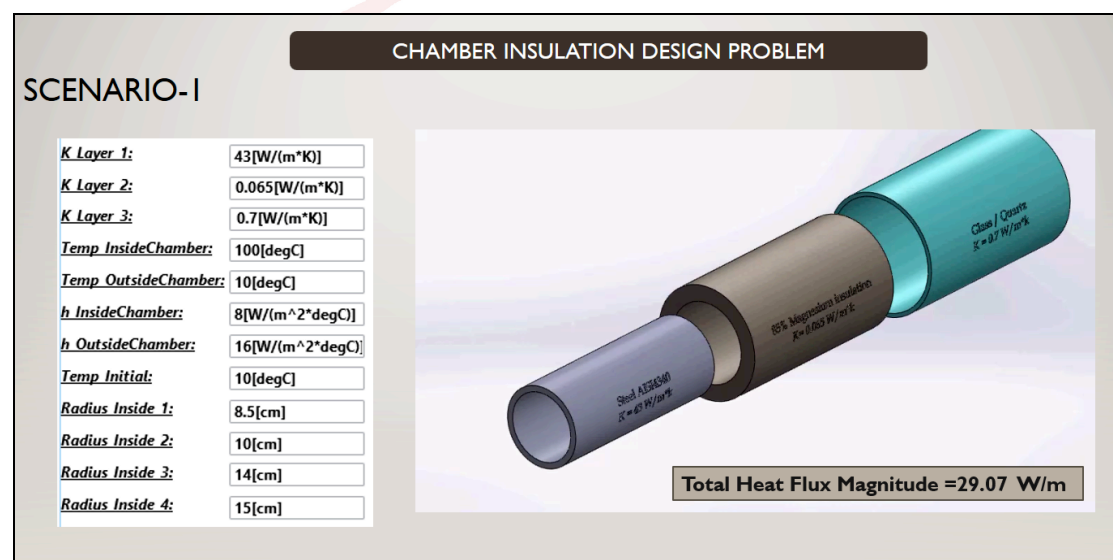


Figure 22: APP-3 First scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

Figure (23) is illustrating the second scenario configuration, where the insulation material is positioned in the inner layer and the steel in the mid layer and the glass for the outer layer.

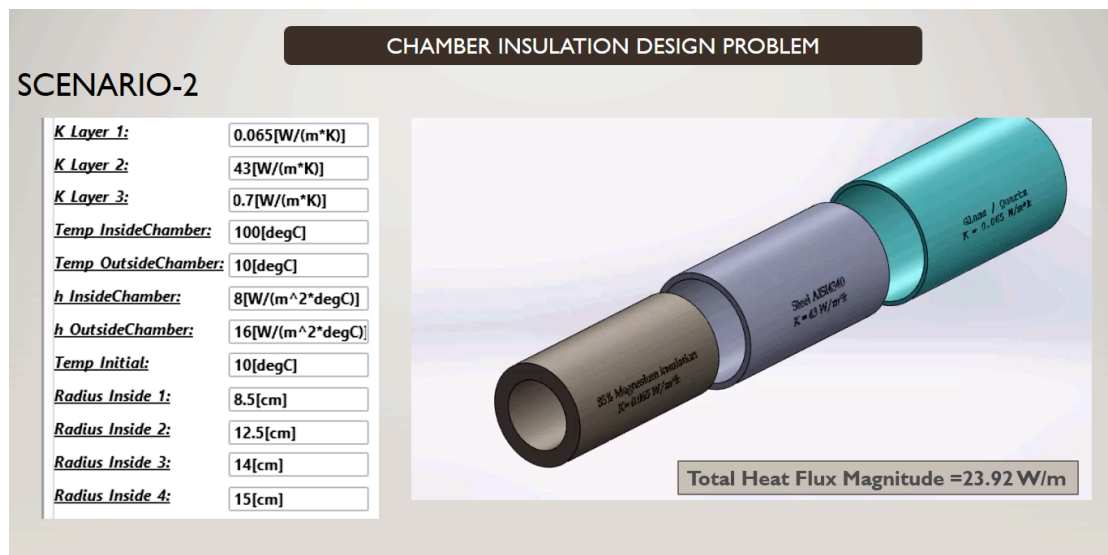


Figure 23: APP-3 Second scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

The third possible scenario as shown in figure (24) is organized as the glass is placed in the inner layer and the insulation material in the mid layer and the steel for the outer layer.

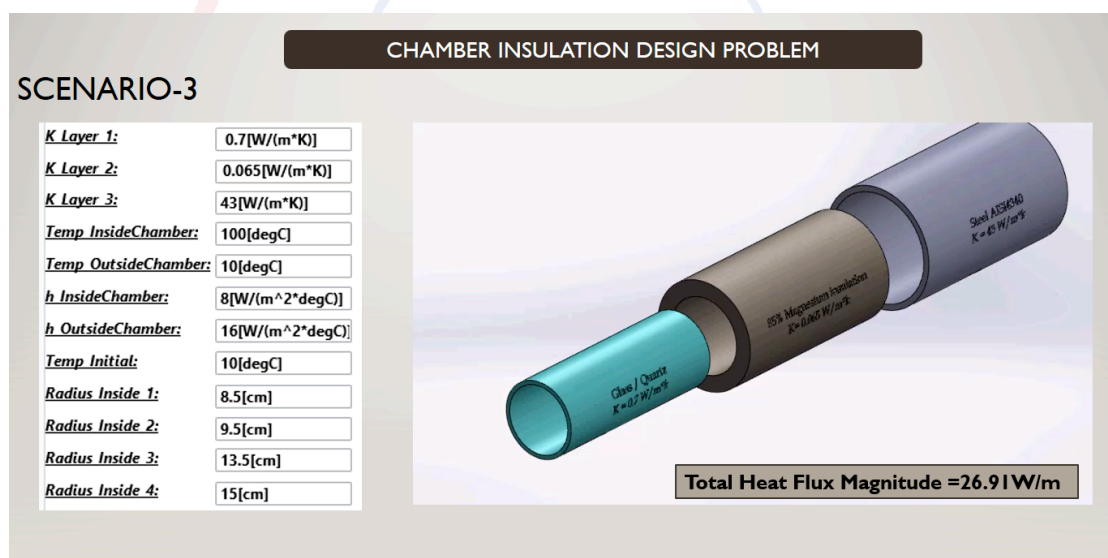


Figure 24: APP-3 Third scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

The arrangement for the whole set in fourth scenario as shown in figure (25) is selected to be the glass layer in the inner position and the steel in mid layer and the insulation material is covering the set as outer layer.

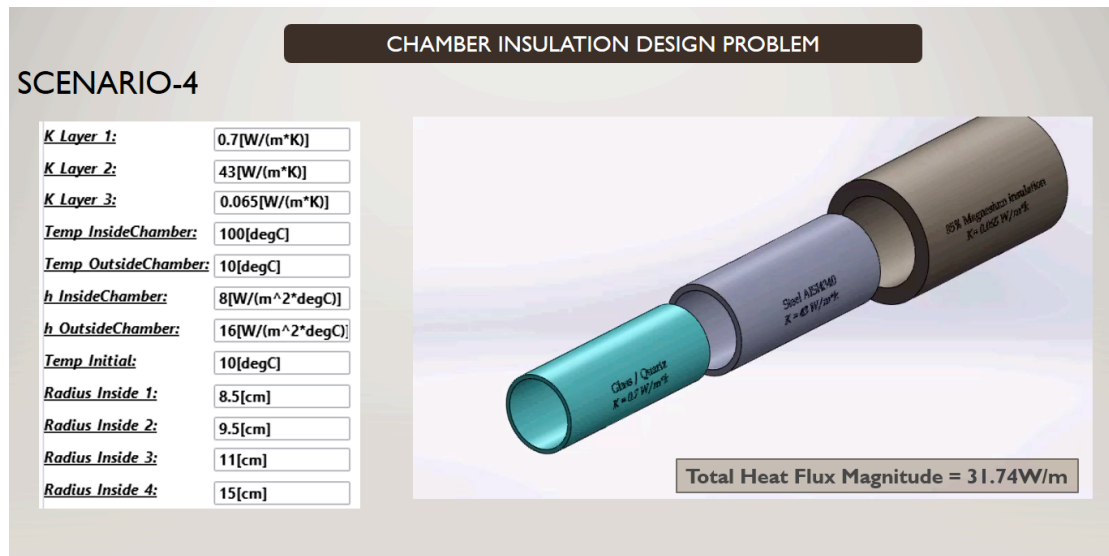


Figure 25: APP-3 Fourth scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

The fifth scenario was sorted as the steel will be in the inner layer and the glass in the mid layer and the insulation for the outer layer as displayed in figure (26)

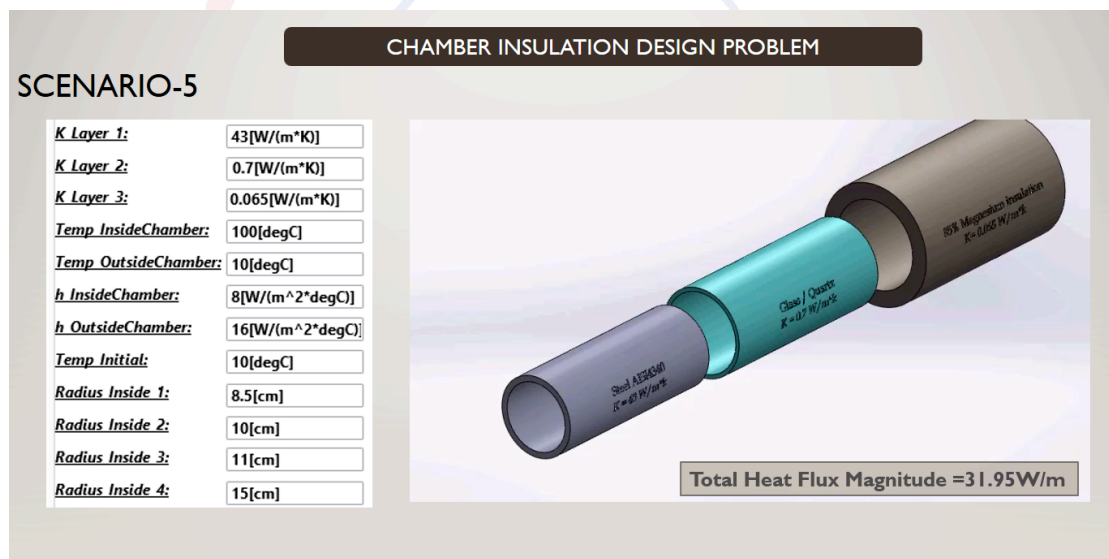


Figure 26: APP-3 Fifth scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

The sixth possible scenario as shown in figure (27) is arranged as the insulation material is positioned in the inner layer and the glass in the mid layer and the steel is covering the set as an outer layer.

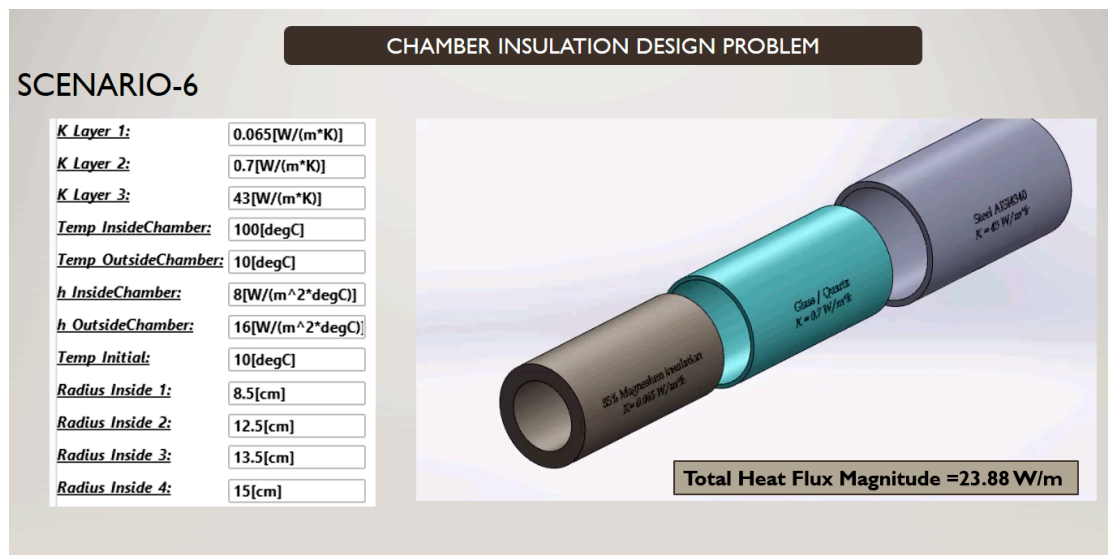


Figure 27: APP-3 Sixth scenario (inner-layer: steel, mid-layer: insulation, outer layer: glass)

By exporting the results of these scenarios to another data analysis software such as MS excel students can compare the resulted values for the total heat flux loss across the layers set and determine the optimum design selection based on the pre-set assumptions. Figure (28) shows MS excel comparison chart for the six possible scenarios as described in figure (21).

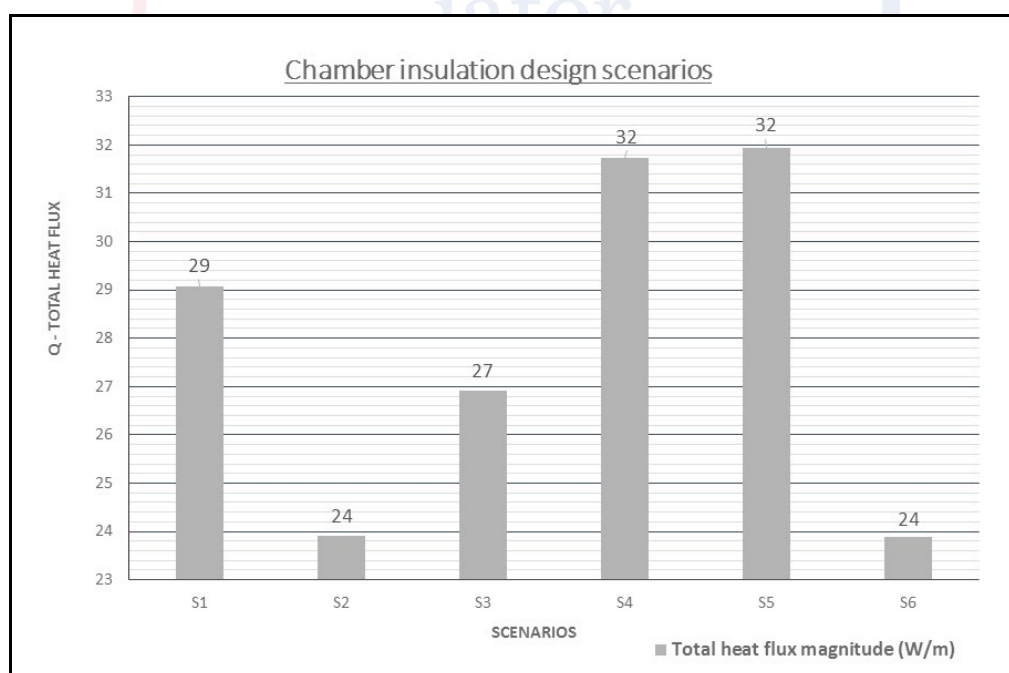


Figure 28: APP-3 Scenarios comparison chart

Conclusion

The aim of this scientific work is to deepen and consolidate the students' knowledge in the fields of heat transfer which is considered one of the important courses at the undergraduate studies level. Using simulation techniques and tools as an advanced teaching aid was an introduction to building the course APPS. These APPS were created by COMSOL Multiphysics by using the built-in APP builder feature.

Comsol Multiphysics deployed APPS are very useful instrument to reach this goal. Even the problems linked to finite element calculations help students to understand processes as well as solution methods. It has been noted that expanding knowledge is gained through different problem boundary conditions. This work reveals that visualized results in the APPS are changeable once the student control the input data and because of their changes they can produce variety of scenarios based on their physics assumptions. However, the future versions of these APPS can be improved by designing POP_UP and hover navigations windows for students to self-guide them while working on these APPS.

Acknowledgments

The authors are grateful to Professor Ali Elkamel from the department of Chemical Engineering, University of Waterloo, Canada, for his valuable support.

The logo for the International Association for Frontiers of Research (IAFOR) is centered on the page. It features the word "iafor" in a light blue, lowercase, sans-serif font. The text is surrounded by two large, concentric, semi-transparent circular arcs. The outer arc is a light blue color, and the inner arc is a light red color. The arcs are positioned such that they frame the text and extend towards the edges of the page.

References

J.P. Holman (2010). Heat Transfer, 10th ed., McGraw-Hill,: Higher Education Press,

S.M. Yang & W.Q. Tao (2006). Heat Transfer, 4th ed., Bei Jing: Higher Education Press,

T. Bergman, A. Lavine, F. Incropera & D. Dewitt (2011). Fundamentals of Heat and Mass Transfer, 7th ed., John Wiley & Sons, Inc.,

COMSOL Multiphysics. (2014). Introduction To Application Builder,

COMSOL Multiphysics website, <http://www.comsol.com/release/5.1/application-builder>

COMSOL Multiphysics website, <http://www.comsol.com/release/5.1/comsol-server>

COMSOL Multiphysics website, <https://www.comsol.it/events/5771/analisi-termiche-e-termo-strutturali-con-comsol-l'esperienza-di-be-cae-and-test/>

Contact email: maedali@elmergib.edu.ly

iafor



***LePo: An Open-Source Learning Management System
with Text Annotation and Content Curation Functions***

Koichi Yoshizaki, Oita University, Japan
Hiroshi Hotta, Sonoda Women's University, Japan

The IAFOR International Conference on Technology in the Classroom – Hawaii 2017
Official Conference Proceedings

Abstract

Web-based Learning Management Systems (LMSs) are widely used in educational institutions mainly because no management cost for native client application and low development cost to adapt the system to multiple client platforms. And the progress in web-related technology makes it possible for web system to implement the functions which were possible only by native application. Based on this situation, we have developed a new web-based LMS named “LePo”. In addition to usual LMS functions like contents and assignments management, LePo has two original functions, Text Annotation (TA) and Content Curation (CC). TA is like a digital sticky. User can put text message on any page in teaching material and set its access level to private or share with the course members. Using CC, user can collect specified part of web contents like text or image from any web pages, pack them with user's original texts and images, organize the contents in display order and share with the course members. Teachers can also put some contents into the student's contents packages for instructional scaffolding. This CC is intended to be used as a preliminary step before writing a report or making a presentation slide in the classroom and to clarify student's thoughts with the citations from web pages. We've developed LePo with mainly Ruby on Rails and will release it by the Spring of 2017 as open-source software to encourage people to use it for their educational purposes and to share the experiences.

Keywords: web-based learning management system, open-source software, text annotation, content curation, Ruby on Rails

iafor

The International Academic Forum
www.iafor.org

1. Introduction

In recent years, many higher education institutions around the world have introduced web-based learning management system (WBLMS). As a WBLMS that is actually used, it is reported that Blackboard, Moodle, and Canvas are popular for higher education institutions in the United States and Canada, and Moodle, own-developed system, and Blackboard are widely used in those of Japan [1][2]. These WBLMS can be distinguished by whether open source software which shares the source code or not. Moodle and Canvas are representative open source WBLMS. In general, open source WBLMS has merits such as being inexpensive to operate and easy to customize compared to proprietary WBLMS.

Meanwhile, as smart devices equipped with iOS and Android OS become widespread, install-type applications for educational use on these devices are also spreading. Compared with the install-type application, web application has advantages such as neither management cost of installing the application nor development cost to support different OS required, but on the other hand, it had disadvantages like it cannot be used offline and no way to use push notifications from the server. The disadvantage of such a web application is beginning to be solved with the progress of web related technologies such as ServiceWorkers in recent years.

2. Purposes

In the present situation where Moodle and Canvas are widely used as representative open-sourced WBLMS, there is no reason for newly developing a WBLMS if only to implement the functions provided by many of the conventional WBLMS, such as viewing digital teaching materials uploaded to the system and evaluating submitted tasks etc. Understanding the current situation like this, the authors set goals to support the following activities efficiently, and independently develop "LePo" [3] (Figure 1.) which is a new web-based LMS.

1. learner centered active learnings
2. various instructional scaffolding activities
3. sharing knowledge about development and operation technology for WBLMS

With regard to goal 1, since activities that learners can actively perform in the system are limited in many conventional WBLMS, it tends to be passive learning using teaching materials or tests prepared by the teacher, except such as bulletin boards activities. As for goal 2, in order to make students' active learning effective, we aim to make teachers able to carry out appropriate scaffolding in various scenes. As for goal 3, to develop the system in cooperation with many developers, we actively utilized the de facto standard open source code and will also make the LePo as open source software. For these goals, Table 1 shows some implemented functions or efforts in the current status. Among them, we will describe some of the functions in the next chapter focusing on functions that are not implemented in existing WBLMS.

And in the actual system construction, we have specifically considered following three points: a. Realization of intuitive user interface, b. Reflection of feedback from students and teachers, c. Utilization of learning resources both inside and outside the system.

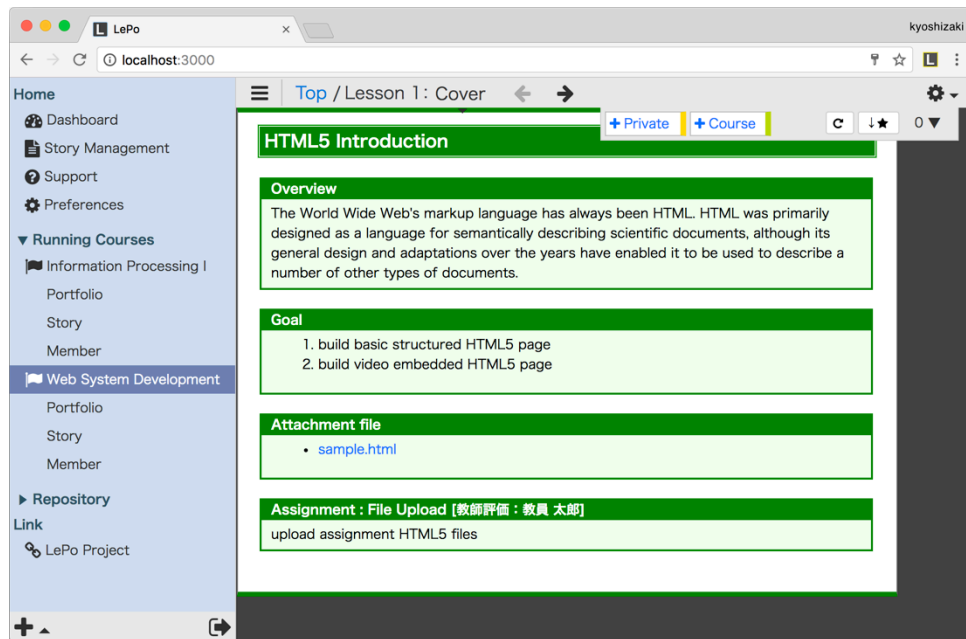


Figure 1: Cover page of sample teaching material

Table 1: Functions or efforts related to goals of LePo

Goal	Implemented function or effort
learner centered active learnings	<ul style="list-style-type: none"> • text annotation • content curation • mutual evaluation of various activities
various instructional scaffolding activities	<ul style="list-style-type: none"> • shareable text annotation • scaffoldings for content curation • learning objectives and evaluation of achievement degree
sharing knowledge about development and operation technology for WBLMS	<ul style="list-style-type: none"> • share as open source software • utilization of de facto standard open source code • proactive adoption of new web related technology

Since LePo has been used and improved for several years in the lectures of the university to which the authors belong, it is particularly suited for use in Japanese educational institutions, but its user interface supports both English and Japanese.

3. Main functions

Some representative functions of LePo are outlined below.

3.1. Text annotation

LePo has a "sticky" function as a text annotation tool that allows users to save text and hyperlinks on arbitrary pages of teaching materials (Figure 2). This sticky

function has "private sticky" that only the author can view, and "course sticky" that can be viewed by students and teachers of a specific course. The private sticky is implemented to the system for personal note for learning records. And the course sticky is for teaching



Figure 2: Some stickies on a page in teaching material

among students about the teaching material or for mutual feedback about their annotations [4].

Also, as a function to feed back to the stickies from the user, a star evaluation function was implemented. This is a function that allows a star to be added when a course sticky reader evaluates the sticky as important. The user can sort the stickies in a page by the number of stars. And by automatically extracting course stickies with many given stars and show the star ranking on the place the student surely sees when using the system, LePo promotes sharing of the contents described on the stickies.

3.2. Content curation

The information on the web page is widely distributed on internet with various media format such as text, images, and movies. The work of gathering these information and organizing them into a composition with its own context is generally called content curation. We thought that content curation function was effective for investigative learning using web pages, so implemented the function to LePo considering the following three points: 1) record of metadata such as citation source URL, 2) sharing and mutual evaluation for deliverable of curation among students, 3) instructional scaffoldings for deliverable of curation by teachers [5].

In order to gather some contents on the web to LePo, it is necessary to register the bookmarklet or browser extension provided by the system in user's browser as preparation. Next, the user selects certain text in the arbitrary web page by the mouse, and operates it with the bookmarklet or browser extension. By this operation, both selected information and related metadata are collected to LePo. With the same kind of operation, user can collect not only text but also various information in the web page such as images (Table 2). Since the collected information is displayed in the

system together with the hyperlink to the web page of the collection source, the context of the collected information at the source page can be easily confirmed (Figure 3). In addition, it is possible to construct contents packages which constitute the contents gathered in the system together with the user's own contents. This contents package is called "story"

Table 2: collectable web contents

collectable web contents
texts, images, YouTube & TED videos, Scratch programs



Figure 3: content curation operation with bookmarklet or web browser extension

Sample Story

This is a sample for story function.

Header

1. Problem to solve

2. Causal analysis

References

1. Aging of Japan - Wikipedia, https://en.wikipedia.org/wiki/Aging_of_Japan (2017-01-06) Jan 06

Inserted texts (scaffoldings) by teacher

Collected web contents by learner

Inputted text by learner

Automatically generated references by LePo

Figure 4: curated contents as a story

in LePo as a deliverable of curation. This function is intended to be used as a preliminary step before writing a report or making a presentation slide in the classroom and to clarify student's thoughts with the citations from web pages [5].

3.3. Others

3.3.1. learning objectives and evaluation of achievement level

When proceeding active learning in an educational institution, it is desirable to clearly show the objectives of learning and also conduct self-assessment or teacher evaluation for the objectives by small steps. In LePo, learning objectives and tasks should be explicitly set to each of the teaching materials [6], and the tasks set for the teaching materials and allocated scores for the objectives are used for quantitative evaluation for the degree of achievement based on the objectives of the teaching material.

In each lesson, it is possible to record and evaluate the degree of achievement of learning without registering a teaching material to LePo, and using only the learning objectives, tasks, and achievement evaluation functions. Based on the fact that LePo also has aspects as an e-portfolio system, we have named LePo from Learning Portfolio.

3.3.2. Push notification

Until recently, it was technically impossible to send a push notification from a web system to a device such as a smartphone. Therefore, in the conventional WBLMS, there was only a way to use a different system such as e-mail when sending some information from the server to a user who is not logged into the system. This situation is beginning to change as several web browsers, such as the Chrome browser, implement ServiceWorkers technology [10]. One of the author and his co-workers have developed message notification function using ServiceWorkers and PushAPI for LePo. Using this function, users who aren't logged into the system can also receive information [11]. In the present status, LePo sends push notification to student when his/her task is evaluated by the course teacher. This function works only with chrome browser on Windows, Mac, and Android (NOT iOS) devices.

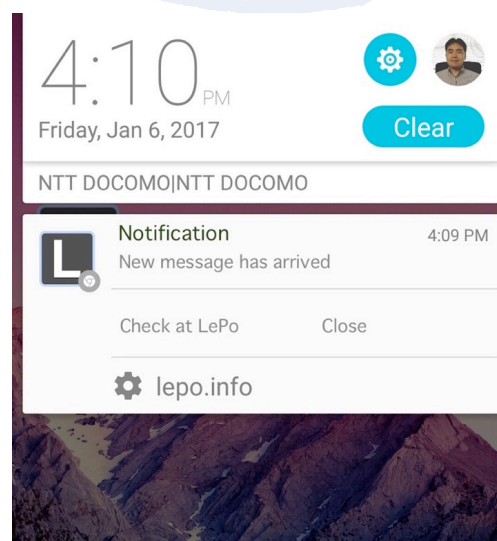


Figure 5: Push notification message from LePo

4. Development and Operation

4.1. Development

LePo is a web application developed mainly using Ruby on Rails 5 [7]. LePo is a SPA (Single-Page Application) which all information updates in the application are accomplished with Ajax, so the information in the page is promptly updated. LePo's page design adopts Bootstrap framework [8] and font-awesome icon [9]. According to the former, responsive design which adapts to small screen sizes of smartphones, and the latter, vector type icon design which does not deteriorate image quality even when enlarged, were realized.

LePo is under development and still a beta version period, but practical evaluations have already been done through several classes targeting university students. Regarding open source, we plan to release it on GitHub by the Spring of 2017.

4.2. Operation

Currently, as an operation environment of LePo, practical evaluation is performed using nginx as the web server, Unicorn as the Rails server, and MySQL as the database. Note that when using the function to send Push notification to the device registered by the user [11], it is necessary to separately use FCM (Firebase Cloud Messaging) [12].

5. Conclusion

In this research, LePo, a new web-based learning management system (WBLMS) has been developed mainly assuming use in the educational institutions. The main goals of the system are to support following activities: 1) learner centered active learnings, 2) various instructional scaffolding activities, 3) sharing knowledge about development and operation technology for WBLMS. Though it is still on a beta version status, LePo implements a function not found in conventional LMSs, such as text annotation and content curation function. In order to make this Web-based LMS more effective, we are planning to make it open source software by the Spring of 2017.

Acknowledgments

This research was subsidized by JSPS Grant-in-Aid for Scientific Research (C) (Issue No. 26330392).

References

- [1] *LMS Market Share for US & Canadian Higher Ed Institutions*, <http://mfeldstein.com/state-higher-ed-lms-market-spring-2016/>
- [2] *Research study on promotion of ICT utilization education*, The Open University of Japan, A commissioned project for promotion of leading university reform by Ministry of education, culture, sports, science and technology, 2011 (in Japanese)
- [3] *LePo*, <http://lepo.info/>
- [4] *An Educational Practice Using Learning Management System with Text Annotation Function*, Koichi Yoshizaki, Hiroshi Hotta, *Computer & Education*, vol.37, pp.67-72, 2014 (in Japanese)
- [5] *The Effects of Content Curation Activity on Text Structure*, Koichi Yoshizaki, Hiroshi Hotta, *The Special Interest Group Technical Reports of IPSJ (CLE)*, 2015-CLE-17(17), pp.1-5, 2015 (in Japanese)
- [6] *Development of Learning Management System with Goal Achievement Evaluation Function*, Koichi Yoshizaki, *Proceedings of the 28th Annual Conference of Japanese Society for Educational Technology*, pp.647-648, 2012 (in Japanese)
- [7] *Ruby on Rails*, <http://rubyonrails.org/>
- [8] *Bootstrap*, <http://getbootstrap.com/>
- [9] *Font Awesome*, <http://fontawesome.io/>
- [10] *Service Workers*, <https://www.w3.org/TR/service-workers/>
- [11] *Development of message notification function for a learning management system using ServiceWorker*, Kenta Urakawa, Minoru Ikebe, Koichi Yoshizaki, Kazuyuki Yoshida, *Proceedings of the 69th Annual Conferences of the electronical and information society of Japan in Kyusyu branch*, pp.315, 2016 (in Japanese)
- [12] *Firebase*, <https://firebase.google.com/>

Contact email: kyoshizaki@gmail.com

Using DVDs to Introduce Multimodal Digital Literacy Practices into the Japanese EFL Classroom

Timothy Wayne Pollock, Hagoromo University of International Studies, Japan

The IAFOR International Conference on Technology in the Classroom – Hawaii 2017
Official Conference Proceedings

Abstract

Despite having the third largest economy in the world, Japan still lags behind countries like Malaysia and Korea in international tests of English proficiency, like TOEIC. Due to a number of factors, English language education in Japanese public schools continues to focus on the older, traditional literacy practices of reading and writing. This paper will explore the historical, cultural and structural reasons for the current state of the Japanese EFL classroom, and offer a simple, easily accessible technological solution to compensate for crucial areas of English language education that are often overlooked: DVDs. Using DVDs has been shown to improve listening skills, as the multiple modes of input, including aural, visual, and written (through subtitles or captions), give students opportunities to improve both bottom-up processing and top-down processing skills, unlike the simple audio recordings that are still ubiquitous in Japanese EFL classrooms. Most students already engage with multimodal digital media, like YouTube or the messaging app Line, so they are comfortable with interactive options like manipulating playback, freeze-framing and clicking on captions. Introducing DVDs into the classroom allows the instructor to train the students in how to utilize these options to decode the spoken English in TV shows. This makes it possible to study two aspects of English seldom taught in Japanese EFL classrooms: The adjustments made in connected speech; and the pragmatic aspects of English, like distancing language. And crucially, it also encourages autonomous learning outside the classroom.

Keywords: literacy practices, multimodal digital literacy practices, English prosody, pragmatics

iafor

The International Academic Forum
www.iafor.org

Introduction

When discussions of technology in the classroom arise, they usually focus on electronic whiteboards, C.A.L.L., or how to best utilize the internet. This paper will argue for the relevance of an older, much more ubiquitous form of technology, DVDs, and show how they can be used to compensate for certain areas in English language education often lacking in Japanese EFL classrooms, like the teaching of pragmatic aspects of English and the introduction of natural, connected speech. Since it is beyond the scope of this paper to show all the various aspects of English that can be taught by using DVDs, the focus will be on the latter.

The very ubiquity of the technology also means that it is readily available to most students, especially since in Japan DVD rental stores are still popular. By training students in how to use the options on the DVD player to help them decode the stream of seemingly unbroken speech, we can also offer students a way to use DVDs to study outside the traditional learning space. And by recommending popular, engaging TV shows to study we can further encourage them to become autonomous learners.

As will be shown below, the Japanese learning context is dominated by a focus on older, more traditional forms of literacy, specifically reading and writing. This is a major determining factor for how English is taught in Japanese public schools, and also accounts for the deficits seen in the English communicative abilities of the vast majority of Japanese university students.

English Instruction in Japan

What follows is a brief overview of how historical and institutional factors have shaped English language instruction in Japan, and some of the deficits in education that are an inevitable by-product of the system.

WJT Mitchell writes of the “pictorial turn” in Western culture and academia. Broadly speaking, this refers to the shift in Western culture from communicating by written text to communicating through images (or in more contemporary terms, communicating through a new multimodal format that features both written texts and images). Mitchell (1993: 13) argues that the impact of this shift can be seen in how “pictures form a point of peculiar friction and discomfort across a broad range of intellectual inquiry.” After initially facing resistance, the study of images entered the Western academy through the field of semiotics, and film studies started to be introduced into the departments of modern languages by the early 70’s.

In Japan, just like in America (Thompson and Bordwell 2010: 29-30), the introduction of films in the first two decades of the 20th century led to criticism and calls for censorship, as film was seen as a degraded form of popular culture only suitable for the uneducated masses, who made up the bulk of the audience (Gerow 2010: 54-59). The difference is that film studies was never really accepted as a subject worthy of formal study in Japan. As late as 2006, an article could be published with the actual subtitle, “Why is There No Film Studies in Japan?” (Yoshimoto 2006).

Whereas American and European academics eventually capitulated to the “pictorial turn” in contemporary society, Japanese academics by and large ignored it, and

continued to focus on more traditional, written forms of literacy. Aloqaili (2016) writes of a parallel situation existing in Saudi Arabia. In the wake of nationwide administrative and curricular reform that eliminated faculties of liberal arts, Japanese English professors doubled down on the teaching of literature as a focus of university English courses (Yoshimoto 2006: 91).

Writing in the journal *Eigo Seinen*, Professor Kishi Tesuo argued that since incoming students care more about school rankings and competitiveness than course content, Japanese English professors can and should make the students study the classics of English literature (usually read in translation) not just in spite of the fact that most students are not interested in it, but because of it (Yoshimoto 2006: 90). The continued focus on, and defense of, the more traditional literacy practices of reading and writing are the primary reasons for the lack of more contemporary multimodal literacy practices and instruction in practical English communication (including instruction in the sound system of spoken English) in the Japanese EFL classroom.

Teaching Natural Pronunciation

While it is uncontroversial that the reduced or “weak” forms of some words and phrases produced in spoken English differ significantly from their citation forms, even outside of Japan there is no widespread agreement on the degree to which these reduced forms should be taught in the ESL and EFL classroom. In a survey of ESL teachers (24% of whom were non-native speaker English teachers), 20% of the respondents said that they “often taught reduced forms as a system of linguistic rules and constraints; 48% often taught reduced forms as a system of pragmatic rules and constraints; and 75% often taught reduced forms within context, using common examples” (Rogerson 2006).

The respondents were given the option of adding their own opinion on the importance of teaching reduced forms, “So much depends on the purpose of their English classes. If the purpose is just conversational English, it is much more important than academic, formal English, where it is less important to stress” (Rogerson 2006: 93). As the author of the study points out, the word choice in this quote “*just* conversational” reveals an attitude towards connected speech as a corrupted form of “academic, formal English.”

This is simply not true, however, “The truth is that connected speech is commonly used in all registers and styles. Even the most formal pronunciation of a language will feature some aspects of these phenomena” (Brown and Kondo-Brown 2006: 5). Or, to quote another teacher in the study, “I have had students (who were never exposed to R.F.) [sic] tell me that for the first time, they felt they were truly learning, plus, the confidence factor is relevant. I’d see student faces after I talked with other native speakers, their confidence could be shattered. We didn’t use textbook English” (Rogerson 2006: 93). The link posited between the study of reduced forms and student confidence is a very important one, which will be explored further below.

This brings us to the EFL context in Japan, where the need for consciousness-raising among teachers may be even more important, as “the majority of English teachers are nonnative speakers, (and as) nonnative speakers (they) may not even be aware of the existence of reduced forms” (Ito 2006: 21). The deep-seated resistance to such

consciousness-raising is exemplified by an article from Rintaro Sato of the Nara University of Education. In the article, Mr. Sato argues that the communicative approach to teaching is an Anglo-American import that is inappropriate for Japanese students. He believes that there is “a huge mismatch between CLT or TBL and the learning situation in Japan” (Sato 2009: 12) and that English education should be in the service of test preparation, not communication. As will be shown below, the audio component of Japanese listening tests often feature, awkward, citation-style pronunciation, obviating the need to ever teach natural pronunciation and the reductions made in connected speech. Mr. Sato’s attitudes and beliefs are especially significant, as he is not just an English teacher, but also a trainer of future English teachers.

Instruction in reduced forms and connected speech is especially crucial for helping students develop the bottom-up processing aspect of listening. This is the active process of decoding the audio signals that are made available to the listener and stitching together individual phonemes to form words and phrases (Rost and Wilson 2013: 10). Training in the unique sound combinations of connected speech is necessary, due to the P400 effect, a lapse in processing that occurs approximately 400 milliseconds after encountering an unknown sound (Dien and Franklin 2010, cited in Rost and Wilson 2013: 10). Frequent lapses can have a cumulative, demotivating effect on the listener.

In spite of multiple attempts at top-down reform by the Education Ministry in Japan (MOMBUSHO), lessons at Japanese public junior high and high schools still tend to be teacher-centered, and written-text focused, with much class time spent directly translating passages from the textbook, and reading aloud from it, with careful, citation pronunciation (Locastro 1996: 49, Gottlieb 2008: 146). As pointed out above by Rintaro Sato, this approach is all driven by the necessity of preparing Japanese English students for the written high school and university entrance tests they must pass in order to be accepted to the best schools (Locastro 1996: 47, Gottlieb 2008: 145).

MOMBUSHO’s multiple attempts to bring Japanese English language instruction in line with international standards and practices were always doomed to failure, as they didn’t include reforms of high school and university entrance tests. Also, as many commentators have pointed out, the recommended changes were not accompanied by enough funding for retraining teachers in the new approaches and teaching techniques required to implement the changes (Tahira 2012: 5).

Another problem with the intense focus on written, text-based learning is that it fails to incorporate the kinds of multi-modal literacy practices that the students engage in outside the classroom, and which they will need training in for a wide variety of future jobs and circumstances (Kress 2003: 163-167). And crucially, the multi-modal nature of much new media makes it a perfect tool for training EFL students in the multi-modal process of face-to-face interaction.

Changes in technology have also changed the literacy practices of reading older, more traditional forms of media, like TV shows. With the ability to pause, rewind and playback any form of visual narrative, spectators have gained the ability to focus on details and analyze content in ways previously denied the consumers of traditional

mass media (Mulvaney 2006: 8). As the students are already conversant in these new interactive forms of literacy, it is the teacher's job to teach students how the same literacy practices they engage in when watching videos on YouTube can also be utilized to study English with authentic materials like TV shows.

A Technological Solution

By using DVDs of TV shows, teachers can give their students many opportunities to develop their bottom-up processing skills in class. Since these shows were created for native speakers, they are often intended strictly for entertainment purposes, meaning they are generally more intrinsically interesting than study materials. There are a number of reasons that DVDs of TV shows are a valuable teaching tool:

1.) Lowering The Affective Filter

Stephen Krashen hypothesized the existence of an *affective filter* that prevents learning (Brown 2014: 289). This is basically an acknowledgement that a student's emotional state can influence their ability to learn. If students feel anxious or panicked, it's said that their affective filter is high, and processing input becomes difficult to impossible. The entertaining nature of TV shows helps alleviate classroom anxiety, and lowers the affective filter, making it easier for students to learn (Wootipong 2014: 210).

2.) Developing Top-Down Processing Skills.

Since TV shows include visuals and dramatic context, they offer students a chance to improve their top-down processing skills, as they can make predictions and educated guesses about what the characters are saying or are going to say based on their background knowledge, and the context that the characters are interacting within. Comprehension is a function of understanding context, and predicting what sorts of language will be used, rather than just waiting for meaning to emerge (Rost and Wilson 2013: 8). For example, if you see a scene in a TV show where two characters see each other for the first time that day, you would naturally assume that the conversation would begin with greetings. Having made that prediction, you become more focused, trying to determine if your prediction was correct.

Face to face conversations require processing of multiple modes of information, from aural input to visual input, which can include gestures, facial expressions, spatial relations and even written text in the conversation. TV shows offer an opportunity to practice processing all these various channels simultaneously (D'Ydewalle 2002, Wootipong 2014), in an EFL context where interacting with native English speakers is not common or practical.

3.) Training Students in New Media Literacy Practices

This leads directly to the next point, which is the need to introduce into the classroom the sorts of multimodal literacy practices that have emerged in the age of new media. As Gunther Kress points out, "The screen is now the dominant site of texts; it is the site which shapes the imagination of the current generation around communication. The screen is the site of the visual, the image" (2003:166).

Many students already engage in these new forms of multimodal, digital literacy practice in their home life (Mills 2010: 35), through social networking sites, YouTube and other activities mediated through the internet. This is less about making fun, engaging lessons for the students (although that is often the result), then it is about helping them gain competency in these new digital literacy practices which have come to dominate many aspects of modern life (Mills 2010: 36).

It is a mistake, however, to assume all students are “digital natives”, and therefore already fluent in the new range of literacy practices; they may need training in them. As film theorist Laura Mulvey points out, new technology, like DVDs have changed the way we interact with old media, like TV shows and movies (2006: 22). The ability to control playback, freeze- frame, rewind, and add subtitles or captions gives the viewer many tools for decoding the sometimes complex interaction of the visual, aural and written modes.

In some cases, a creative feedback loop has been created, where content is designed to include information that can only be revealed in freeze-frame, or by slowing down playback. These very decoding skills can be employed by the students to use DVDs to study autonomously at home, outside the school learning space.

4.) Developing Autonomous Learners

Classroom study at the university is not sufficient for students to truly become proficient in English (Shiobara 2016). It is the teacher’s responsibility to instruct the students in how they can study on their own (Rost and Wilson 2013: 17). Again, with proper instruction in class, students can use DVDs to study at home, by choosing their own favorite TV shows, manipulating the playback of the show, and utilizing the options of subtitles or just-in-time English captions (Rogers 2014: 40).

5.) Increasing Motivation

Interesting research done in Hungary suggests that L2 learners can experience an improvement in their perceived motivation to study by indirect contact with the L2 culture through the media (Csizer and Kormos 2008: 172-173). It is an important extension of the older, more established idea that contact with L2 speakers can improve motivation to study. Important, because in monolingual EFL environments like Hungary and Japan, the chances of significant contact with native English speakers (NSs) are slim.

Motivation and the Construction of the Self

For many years the dominant theory in the SLA study of motivation has been the notion of an integrative orientation. (Ushioda and Dornyei 2009: 2). While there are many arguments about the exact definition of the phrase, for the purposes of this paper it will be defined as the desire of learners to integrate themselves into the culture of the second language group and to interact socially with that group (Brown, H. 2014: 162). This orientation was put forward as the most powerful motivating factor behind L2 learners’ motivated behavior.

The idea has come under attack on both theoretical and research-based grounds. There have been a lot of conflicting results from research into the influence of the integrative orientation on learners' motivated behavior, but the biggest objection raised seems to be definitional and theoretical. Many writers argue that since English has become an international lingua franca, it has been separated from its cultural roots to the extent that L2 learners don't see it as having any sort of a monocultural background that they could integrate into (Pavlenko 2002: 279, cited in Ushioda and Dornyei 2009: 5).

Poststructuralist theories on the construction of self also undermine this version of integration. Coetzee-Van Rooey argues that the idea of integration rests on the incorrect assumption that, "learning a second language somehow results in the loss of the first language and the establishment of a new 'simple' identity as monolingual speaker of the target language (Coetzee-Van Rooey 2006, as cited in Ushioda and Dornyei 2009: 5).

Arnett (2002) argues that the pressure in the new globalised world is for people to develop a "bicultural identity" that incorporates elements of their L1 cultural identity with elements of the more international identity now associated with English (Dornyei 2009: 24). This reflects the poststructuralist idea that people construct their own identity by choosing from the different options available to them.

The idea that integration is an external phenomenon, where a person seeks to become a member of a different cultural group, has been transformed into the idea that it is actually an internal process. On this view, L2 learners decide which aspects of the L2 culture they want to integrate into their own sense of self. Bear in mind that the L2 English culture is now characterized as a global community comprised of people from many different nations, with no single dominant culture. The internalization of integration leads to the next important development in L2 motivation theory: Dornyei's L2 Motivational Self System.

Dornyei proposes the notion of the *ideal self*. The ideal self is a goal, as it is the image of the person one wants to be in the future (Dornyei 2009: 13). Referring to self-discrepancy theory, Dornyei posits that people are motivated to lessen the difference between their current self and their ideal self (Dornyei 2009: 18).

An important element in the L2 Motivational System, is the notion that images can in fact have a powerful effect on learners' motivated behavior. Dornyei (2009: 16) cites research (Kosslyn, et al. 2002) that confirms that humans respond to mental images in a way similar to they way they respond to visual ones. The image of one's future ideal self creates a very real emotional and mental state, one that is hypothesized by some psychologists (Markus and Ruvalo 1989: 217, cited in Dornyei 2009: 13) to be very similar to the very states one experiences when actually in the process of trying to achieve the goal.

Dornyei ties this together with research done into the motivational power of mental imagery in sports psychology (Dornyei 2009: 16-17). So, in addition to giving learners indirect exposure to the L2 culture (as a means of increasing motivation), using DVDs as instructional materials, as well as showing students how to use DVDs to study on their own, gives students the experience of engaging with authentic

materials in a meaningful way, thereby making it more possible for them to envision themselves as consumers of authentic materials in the future.

Using DVDs to Teach Natural Pronunciation

Before showing how DVDs can be used to help students improve their listening skills by becoming familiar with natural pronunciation, it is first necessary to clarify the terminology needed to discuss it. The literature features many different terms and phrases to refer to natural pronunciation, but for the purposes of this paper, *connected speech* will serve as the umbrella term under which *reduced forms* are categorized.

Connected speech here will be used to refer to the more general prosodic features of English, like rhythm and intonation patterns. Reduced forms refer to the spoken forms of words and phrases that have undergone phonological processes like assimilation, palatalization, deletion, and more, that make it possible to maintain the natural rhythm of spoken English.

Theoretical Background

The difficulty L2 learners experience trying to understand the reduced forms in connected speech are reported in Bley-Vorman & Kweon, 2002; Bowen, 1976; Brown & Hilferty, 1986a, 1986b; Henrichsen 1984; Ito, 2001; Kim, 1995; and Kweon, 2000 (Brown and Kondo-Brown 2006: 5-6). But previous studies have also demonstrated that improving learners' ability to understand reduced forms is possible.

A problem that persists in Japan is that most EFL listening materials feature graded speech, with slow, careful citation pronunciation. As will be explained in more detail below, public school English lessons in Japan still tend to be teacher-centered, and focused on reading and writing (Tahira 2012:6, Gottlieb 2008: 146). Even with all the attempts at top-down reform, many classes are still taught according to the grammar translation method. This involves the teacher giving a line-by-line translation of an English passage in the textbook into Japanese, with extensive commentary on the grammar. Students often spend a large amount of class time translating sections from the textbook into Japanese themselves, and reading aloud from the textbook.

Many experts in reading point out that reading aloud is actually counter-productive to comprehension, as the student becomes focused on producing individual sounds, preventing them from processing the global meaning of what they are actually reading (Locastro 1996: 51). The result of this focus on reading and writing is that spoken English is often just an aural version of written English with each word carefully enunciated, citation-style.

An example of the kind of pronunciation students are exposed to can be found in the national English proficiency test known as the STEP test. This test is taken by Japanese elementary, junior high, and high school students, and the results can help them gain admission to high schools or universities. A close examination of the listening section of the 2015 level 1 test (the highest level offered), reveals almost a complete lack of the sorts of reductions and adjustments native speakers make in their pronunciation of words when speaking naturally. The spoken English featured is nothing more than an aural version of written English, with careful citation

pronunciation of each word. The one exception was some occurrences of the process of palatalization, whereby *did you* is pronounced *didju*.

This is significant, because English teachers are only expected to pass the pre-1 level test, which is the next level down from level 1. This shows that even teachers aren't expected to be familiar with natural pronunciation. The STEP test is not so much a test of English proficiency as it is a test of whether the students have learned English as it is taught in Japanese schools. This is not surprising, as the main driver of how English is taught in Japan is the importance of high school and university entrance exams (Gottlieb 2008: 146). Most of the tests are written by academics, who view spoken English as a degraded, ungrammatical form of the language, and not worthy of study (Locastro 1996: 47).

The good news is, however, that Japanese L2 English learners have proven especially capable of learning reduced forms (Rogerson 2006: 86-87). This is possibly due to L1 influence, "English consonant clusters are difficult for Japanese learners, and they often tend to break them up by inserting short vowels, which also serve to 'round off' final consonants. So for instance, table may be pronounced /teberu/, or match /matchi/" (Thompson 2001: 298).

Many of the reduced forms in connected speech involve changes in pronunciation that are quite welcome to learners who are not comfortable with words that end in consonants. For example, *want to* changes to *wanna*, eliminating the troublesome final /t/ in *want*. This process of schwa reduction is very common in English, and means that the endings of many words are replaced by a schwa sound, the most common sound in English (Celce-Murcia 2010: 378). Something similar occurs in instances of consonant to vowel linking.

The very learnability of connected speech, and the success so many students have with it, can increase their motivation. "Clement, Dornyei and Noels showed that linguistic self confidence...contributed to foreign language learning situations where the learners had little contact with the L2 outside of class (Ellis 2008: 684)." Here self-confidence is defined as the belief that one actually has the ability to learn the L2 (Ellis 2008: 684).

Preparing the Students

Due to the lack of class time, it is necessary to give explicit instruction in the rhythm of English and the adjustments made in connected speech that help promote the regularity of the rhythm (Celce-Murcia 2010: 157). And it is believed that a more systematic approach to teaching reduced forms will help the students (Rogerson 2006: 86-87).

It's important to teach students the highest frequency adjustments made in connected speech, including schwa reductions, palatalization, consonant-to-vowel linking and consonant-to-consonant linking. All of the above blur word boundaries, and therefore make bottom-up processing more difficult.

In addition to the schwa reductions mentioned above, there is palatalization, which involves a change in the place of articulation, and results in *did you* being pronounced

didju, and “*How about you?*” being pronounced “*Howbouchoo?*” (Celce-Murcia 2010: 171). Consonant-to-vowel linking results in erasing some word boundaries, so that “*What about it?*” becomes “*Whaddaboudit?*” in a process called intervocalic consonant sharing (Celce-Murcia 2010: 166). Another kind of linking occurs when two geminate consonants are linked, so that *start talking* becomes *startalking*, where the /t/ sound at the word boundary is elongated but only articulated once (Celce-Murcia 2010: 167).

When first encountering the changes made in connected speech, students need scaffolding and support from the teacher, and listening exercises that slowly increase in difficulty, allowing them to improve at a steady, comfortable pace. To that end, listening practice can start with simple cloze exercises utilizing native speakers reciting individual sentences, slowly leading up to a cloze exercise with a full dialogue. The instruction can also include production practice, using a customizable version of the previously mentioned dialogue. This is based on the idea that production is linked to listening comprehension (Ito 2006: 21).

Next, students are ready for cloze exercises with contemporary pop songs, which they can then sing along with for practice. By choosing songs that are popular with the students, their classroom anxiety can be lowered, which in turn lowers their affective filter. A conscious decision was made to forego the use of IPA symbols, as too much class time would be needed to teach them. Also, it is important for students to see how these changes in pronunciation are represented orthographically, as they will most certainly encounter them when reading dialogues in fictional works.

At this point, the students are finally ready to attempt listening practice with a TV show.

Teacher Preparation

TV shows are just another form of input, a particularly rich one that has been proven to be effective in promoting vocabulary acquisition (D’Ydewalle 2002) and improving listening comprehension (Birulés-Muntané and Soto-Farac 2016, Wootipong 2014). The problem for the teacher is that the TV show is just raw material, which must be carefully sifted through in order to find the teachable aspects of it. It usually takes at least two viewings to choose some good dialogue that features the kinds of reduced forms that have already been pre-taught. This is also an opportunity to pull any useful words or phrases that can be pre-taught prior to viewing, to facilitate acquisition.

The next point depends entirely on the teacher’s knowledge of her students’ culture: It is helpful to note any significant differences between the L1 and L2 cultures. Pre-teaching how exactly the L2 culture of the TV show differs from the L1 culture of the students will be invaluable when the students try to employ guessing and predicting strategies as a function of top-down processing.

And finally, it is important to remember that while L1 subtitles can generally be trusted to convey overall plot development, it should never be assumed that the subtitles provided are an exact translation for every sentence uttered. It is important for the teacher to prepare an explanation for any sentence that is isolated for study.

Viewing the TV Show

After all the preparation is done, it is finally possible to have the students watch the TV show. A handout with cloze exercises prepared for key sentences will help students focus on specific listening tasks, and the video can also be rewound to repeat the key sentences. Since one of the primary aims of using TV shows is to lower the affective filter, the first viewing of the show should be accompanied with L1 subtitles.

However, L2 captions have been shown to be more effective in promoting vocabulary acquisition and improving listening (D'Ydewalle 2002), so after showing an episode once, it is a good idea to change the subtitles and give the students another chance to practice their listening, this time accompanied by English captions which “provide just-in-time written lexical information that can help disambiguate and parse phonemic information” (Birulés-Muntané and Soto-Farac 2016), which means the written text helps the students determine word boundaries, and the combination of written text with the audio helps the student in developing their bottom-up processing skills.

Conclusion

Due to a variety of historical, institutional and cultural factors, English education in Japan has tended to focus on the acquisition of the more traditional literacy practices of reading and writing, with the results being that many students are unable to communicate in English, even after six years of study in junior high and high school. This paper has argued that through the introduction of new multimodal digital literacy practices into the classroom, this deficit in necessary English skills can be compensated for.

By acknowledging the cultural shift to communicating through multimodal new media, the pictorial turn, universities can help train students, who are not all “digital natives”, in these new literacy practices. Crucially, the use of multimodal content can motivate students to become more autonomous learners, as the technology and presentation give them tools to break down and analyze the English used. Second language acquisition is not possible if study is limited to the classroom environment.

References

Aloqaili, G. “Learning Vocabulary from Subtitled Videos: An Investigation into the Effectiveness of Using Subtitled Videos for Intentional Vocabulary Learning in Saudi Arabia with an Exploration of Learners’ Perspective.” (Unpublished Master’s Thesis) (<https://englishagenda.britishcouncil.org/sites/ec/files/Learning%20vocabulary%20from%20subtitled%20videos%20v2.pdf> (Accessed: 2016/7/24))

Barrera-Pardo, D. (2008) “The Reality of Stress-Timing.” *ELT Journal* 62/1: pp.1-17

Birulés-Muntané, J & Soto-Faraco, S. (2016) “Watching Subtitled Films Can Help Learning Foreign Language”, *PLOS ONE*, (<http://dx.doi.org/10.1371/journal.pone.0158409> (Accessed: 2016/7/24))

Brown, D. H. (2014) *Principles of Language Learning and Teaching*. 6th ed. White Plains, N.Y.: Pearson Education

Brown, J. and Kondo-Brown, K. (eds.) (2006) *Perspectives on Teaching Connected Speech to Second Language Speakers*. Honolulu: University of Hawai’i, National Foreign Language Resource Center

Brown, J. D. and Hilferty, A. (2006) “The Effectiveness of Teaching Reduced Forms for Listening Comprehension” in Brown, J & Kondo-Brown, K (eds.) *Perspectives on Teaching Connected Speech to Second Language Speakers*, pp. 51-58

Celce-Murcia, M., Brinton, D., Goodwin, J. and Griner, B.(2010) *Teaching Pronunciation: A Course Book and Reference Guide*. Cambridge: Cambridge University Press

Csizer, K. and Kormos, J. (2008) “Modelling the Role of Inter-cultural Contact in the Motivation of Learning English as a Foreign Language.” *Applied Linguistics* 30/2: pp. 166-185

Dornyei, Z. (2009) “The L2 Motivational Self System” in Ushioda, E. and Dornyei, Z. (eds.) *Motivation, Language Identity and the L2 Self*. Bristol: Multilingual Matters, pp. 9-42

D’Ydewalle, G. (2002). “Foreign-language Acquisition by Watching Subtitled Television Programs.” *Journal of Foreign Language Education and Research* 12:59-77. (https://www.kansaiu.ac.jp/fl/publication/pdf_education/04/4geryd'ydewalle.pdf (Accessed: 2016/7/24))

Ellis, R. (2008) *The Study of Second Language Acquisition*. 2nd ed. Oxford: Oxford University Press

Gerow, A. (2010) *Visions of Japanese Modernity: Articulations of Cinema, Nation and Spectatorship, 1895-1925*. Berkely: University of California Press

- Gottlieb, N. (2008) "Japan: Language Policy and Planning in Transition" in Kaplan, R. and Baldauf, R. (eds.) *Language Planning and Policy in Asia, Vol. 1*. Bristol, Multilingual Matters, pp. 102-169
- Ito, Y. (2006) "The Significance of Reduced Forms in L2 Pedagogy" in *Perspectives on Teaching Connected Speech to Second Language Speakers*. Honolulu: University of Hawai'i, National Foreign Language Resource Center, pp. 17-25
- Kress, G. (2003) *Literacy in the New Media Age*. Abingdon: Routledge
- Locastro, V. (1996) "English Language Education in Japan" in Coleman, H. (ed.) *Society and the Language Classroom*. Cambridge: Cambridge University Press, pp. 40-58
- Matsuzawa, T. (2006) "Comprehension of English Reduced Forms by Japanese Business People and the Effectiveness of Instruction" in Brown, J & Kondo-Brown, K (eds.) *Perspectives on Teaching Connected Speech to Second Language Speakers*, pp. 59-79
- Mills, K. (2010) "Shrek Meets Vygotsky: Rethinking Adolescents' Multimodal Literacy Practices in Schools", *Journal of Adolescent and Adult Literacy*, 54/1: pp. 35-46
- Mitchell, W. (1994) *Picture Theory: Essays on Verbal and Visual Communication*, Chicago: The University of Chicago Press
- Mulvey, L. (2006) *Death 24x a Second: Stillness and the Moving Image*. London, Reaktion Books
- Rogers, J (2014) "On the Potential for Television to Improve Listening Comprehension" *The Kyoto JALT Review*, 2, 29-46.
- Rogerson, M. (2006) "Don'cha know? A Survey of ESL Teachers' Perspectives on Reduced Forms Instruction" in Brown, J. & Kondo-Brown, K. (eds.) *Perspectives on Teaching Connected Speech to Second Language Speakers*. Honolulu: University of Hawai'i, National Foreign Language Resource Center, pp. 85-97
- Rost, M. & Wilson, J. (2013) *Active Listening*. Harlow: Pearson Education Limited
- Salinger, J. (1991) *Nine Stories*. Boston: Little, Brown and Company
- Shiobara, F (2016) "The 10,000 Hour Rule and What it Means for Language Teaching" THINK.IAFOR.ORG <http://think.iafor.org/10000-hour-rule-what-it-means-for-language-teaching/> (Accessed 2017/2/08)
- Tahira, M. (2012). "Behind MEXT's New Course of Study Guidelines." *The Language Teacher*, 36/3: pp. 3-8

Thompson, I. (2001) “Japanese Speakers” in Swan, M. & Smith, B. (eds.) *Learner English*. 2nd ed. Cambridge: Cambridge University Press, pp. 296-309

Thompson, K. and Bordwell, D. (2010) *Film History: An Introduction*, 3rd ed. New York City: McGraw-Hill

Ushioda, E. and Dornyei, Z. (2009) “Motivation, Language Identities and the L2 Self: A Theoretical Overview” in Dornyei, Z. and Ushioda, E. (eds.) *Motivation, Language Identity and the L2 Self*. Bristol: Multilingual Matters, pp. 1-8

Wootipog, K (2014) “Effects of Using Video Materials in the Teaching of Listening Skills for University Students” *International Journal of Linguistics*, 6/4: p. 210 (<http://dx.doi.org/10.5296/ijl.v6i4.5870> (Accessed: 2016/7/24))

Yoshimoto, M. (2006) “The University, Disciplines, National Identity: Why is There No Film Studies in Japan?” in Yoda, T. & Harootunian, H. (eds.) *Japan After Japan: Social and Cultural Life from the Recessionary 1990s to the Present*. Durham: Duke University Press, pp. 81-97

『2016 年度版 英検 1 級過去 6 回全問題集』旺文社、2016 (*The 2016 Eiken English Proficiency Test*)

The logo for IAFOR (International Association for Frontiers of Research) is centered on the page. It features the word "iafor" in a lowercase, sans-serif font. The text is surrounded by two large, stylized, curved lines that form a partial circle, one in a light blue color and the other in a light red color.

©The International Academic Forum 2017
The International Academic Forum (IAFOR)
Sakae 1-16-26-201
Naka Ward, Nagoya, Aichi
Japan 460-0008
www.iafor.org