Modul University Vienna

Successfully Teaching Business Administration Students Programming in a Single Semester

Modul University

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Overview

- Business Administration fields and an increasing need for programming skills
  - Some motivations
  - Business Informatics (Wirtschaftsinformatik), programming as fourth cultural technique
- Typical introduction to programming course
  - Motivation
  - TU Vienna, "Introduction to Programming 1+2" syllabus
- Innovative "Business Programming"
  - Motivation
  - WU Vienna, "Business Programming 1+2" syllabus
  - Critical success factors
  - Suggestions for teaching formats for Modul University employees
- Roundup

Business Adminstration and IS/IT

- Proliferation of information systems/information technology
  - 70 years ago in German speaking countries the BA field "Wirtschaftsfinformatik" (Business Informatics) got formed, becoming a proper research field
  - Today, IS/IT has become the backbone of any field of Business Administration
    - IS/IT enabler of constantly innovating and improving business processes
    - Advent of "artificial intelligence" (AI) having become visible in all BA fields
      - LLM (large language models)
      - ML (machine learning)
      - Information systems employing and combining AI tools and AI services
    - Modern BA students need to understand the principles and concepts IS/IT adhere to
      - Programming skills empower one to interact and control any deployed IS/IT
      - In effect, *programming can be seen as the fourth cultural technique for humans*!

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Typical Introduction to Programming Course

- Motivation
  - Teach programming using one of the currently important programming languages
    - Expect succeeding students to be immediately usable for IS projects at the institution
    - Hence, kill two birds with a single stone!
  - TU Vienna, syllabus using the Java programming language (2023w, 2024s)
    - ***"Introduction to Programming 1"***, 4h/5.5 ECTS (137.5 hours), teaching outcomes
      - Procedural programming concepts (variables, datatypes, branches, loops, subprograms, ...), input/output, recursion, basic algorithms (searching, sorting), fundamental developing methods (procedural abstractions, debugging, ...) and development environment
    - ***"Introduction to Programming 2"***, 3h/4 ECTS (100 hours), teaching outcomes
      - Creating working Java programs, being able to describe and to implement predefined datastructures, algorithms and abstract datatypes, input from/output to files, verify input, describe common errors, exception handling, testing, communicate with dev partner

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Innovative "Business Programming", 1

- Motivation
  - Teach interested Business Administration students programming
  - Teach *important IS concepts* and apply them with the learned programming skills
    - E.g., Windows OLE to interact with and program Windows applications like MS Excel, W3C DOM (document object model) to understand, access and parse web resources, ...
  - WU Vienna, a Business university
    - Developed employing *participation observation* over 35 years
    - Experimented with *different programming languages*
    - *Continually improved course*, e.g., adapted programming language, course contents (slides, examples, ...), pedagogical approaches depending on the observed understanding and observed problems of the students, semester after semester...
    - For more than 15 years the developed syallabus has been working successfully

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Innovative "Business Programming", 2

- WU Vienna (continued)
  - Syllabus using the programming language ooRexx (2025/26)
    - ***"Business Programming 1"*** (BP1), 2h/4 ECTS (100 hours), 4h/7weeks, teaching outcomes
      - Procedural programming concepts (variables, datatypes, branches, loops, subprograms/routines, ...), object-oriented programming concepts (classes/types/structures, abstract datatypes (ADT), implementation of ADTs, classification tree, inheritance, method resolution, collection classes), testing, tracing/debugging, message paradigm, Windows OLE (Wscript.Shell, Excel, DHTML/DOM, XHTML, ...), oleinfo tool; code pages, processes and environment variables, standard files, commands, redirection, pipes, cURL, LLM (AI), ...
    - ***"Business Programming 2"*** (BP2), 2h/4 ECTS (100 hours), 4h/7weeks, teaching outcomes
      - Portable programming by using Java class libraries (no vendor lock-ins) to learn and to apply IS concepts like GUI programming (awt, swing), Internet (socket, SSL/TLS) programming, XML, using DOM and SAX parsing libraries, XSLT, web scraping, OpenOffice/LibreOffice or ML (AI) with Weka, Java scripting framework programming, creating and programming powerful JavaFX GUIs in an easy manner (SceneBuilder, FXML and Java scripting with event programming), ...

Innovative "Business Programming", 3

- Compared to the TU syllabus, the syllabus at WU *successfully teaches about four to five times more important concepts, yet, with 0% dropouts!*
  - *"BP1" covers all of the TU content* (highlighted in blue), i.e., "Introduction to Programming 1 and 2"!
  - The additional "Business Programming" concepts taught and excercised are highlighted in red
- Critical success factors for the success of "Business Programming"
  - Use an easy to learn programming language (ooRexx)
  - Pareto principle
  - Humboldt's ideal (participation observation a must)
  - No student is left alone (pair programming)
  - Searching the Internet and exploiting AI for further explanations
  - Nutshell examples with output
  - Regular coding assignments
  - Concluding project assignment, one for BP1, one for BP2

Innovative "Business Programming", 4

- Offer to all academic and administration employees of Modul University
  - Empower yourself with a "Business Programming" course
    - Become able to understand how to interact with IS and thereby IT
    - Interact with Windows and Windows programs like MS Excel, MS Word, your operating system, with LLMs (AI), assess and employ ML (AI) for your needs, exploit all kind of web services, all available Java class libraries, become able to write macros/scripts for (MU) applications, and much more
    - Solve *your* problems and challenges *on your own* with *your* acquired programming skills!
  - Learning is an investment into the future, always effortful, hence
    - Need a serious, personal commitment
    - Commitment to attend until the "sweet end" with the promise that the
    - Acquired knowledge and experiences will be fruitful and helpful for the rest of your life!

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Innovative "Business Programming", 5

- Offer to all academic and administration employees of Modul University
  - Suggesting a format *during the summer break* with in-person meetings at MU
    - "Business Programming 1", two lectures a day (10:00-12:00, 14:00-16:00)
      - Week 1: Monday, Tuesday, Wednesday, Thursday
      - Week 2: Monday, Tuesday, Wednesday
    - "Business Programming 2", two lectures a day (10:00-12:00, 14:00-16:00)
      - Week 3: Monday, Tuesday, Wednesday, Thursday
      - Week 4: Monday, Tuesday, Wednesday
  - Suggesting a format for "Business Programming 1+2" *during an entire semester*, e.g.,
    - Weekly during the semester, 14 weeks altogether
      - Lectures twice a week, Monday *and* Wednesday
      - Lectures either from 10:00-12:00, or, alternatively, from 16:00-18:00
      - Assignments until next lecture

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Roundup "Business Programming"

- BA students can successfully learn and apply programming
  - BP1 and BP2 totalling 4 hours/8 ECTS (200 hours teaching load) per semester
  - Use an easy to learn programming language (ooRexx)
    - Learned concepts can be quickly applied to other languages like Java, Python, JavaScript
    - Hence, learning additional languages in a fraction of time!
  - Constantly apply the identified critical success factors
- "Business Programming" course concept can be successfully used to
  - Empower *anyone* with programming skills, from pupils to students to employees to managers
  - *However,* a personal motivation, and personal commitment *a must* for success
  - An offer to Modul University employees, if motivated
- Questions?

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Some References

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- Non-profit special interest group "Rexx Language Association" (RexxLA) owning and publishing open-source Rexx languages including ooRexx (open object Rexx) and important Rexx related libraries, Link: https://www.RexxLA.org