CODEMAO SKILLS MODEL REPORT

编程猫®

Codemao AI LAB 2018

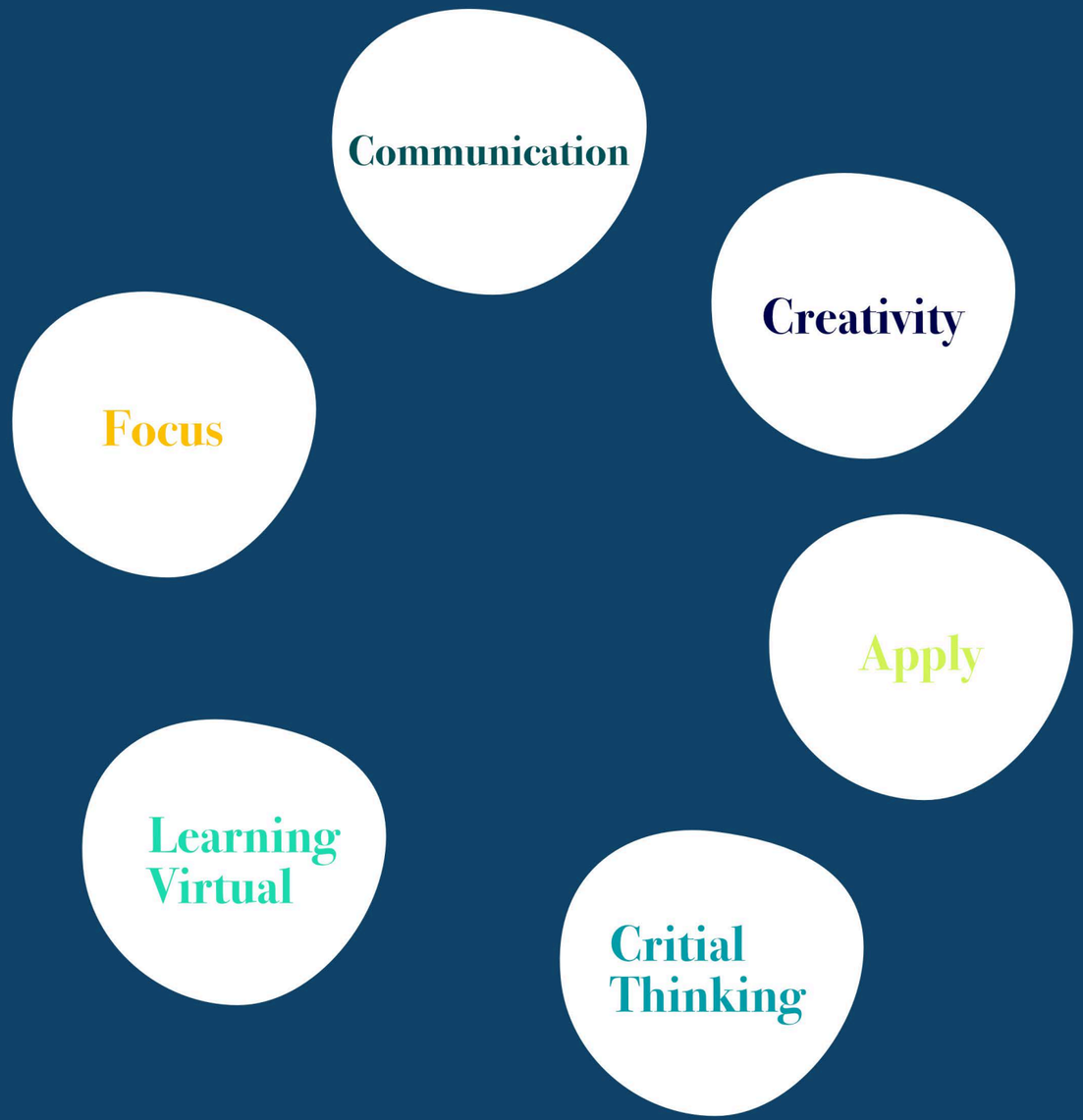
About Skills Model Research Project

Over the past few months, Codemao AI LAB team dedicated to develop an Artificial Intelligent system to assist students to learn programming at CODEMAO. As we seek to apply the benefit of big data to our online STEM education system, Dr Jin Lin, a tenured Associate Professor at Brown University, and her team decided to collaborate with us to build a student profiling system. Her book 《Cultural Foundations of Learning: East and West》 was an important inspiration for this project at the early stage of our research. The purpose of this project is to build an innovative profiling system to track and analysis students' data at CODEMAO platform. Our research has led us to develop an Audition Report for CODEMAO users, as well as a framework for the future student profiling system .

With this report we hope to provide developers with more information about student learning behaviors so that they can have better understand how to evaluate students skills and help our students to improve these skills. It is our hope that more researchers and developers will continue this study and develop a better AI system at CODEMAO.

Contents

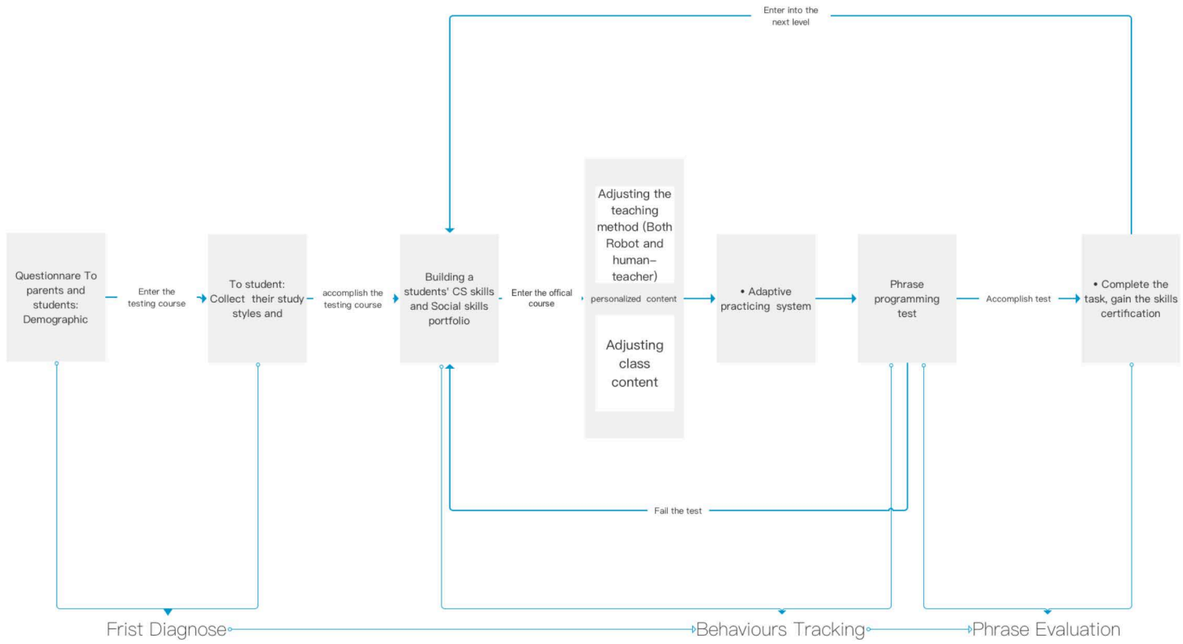
Codemao Six Skills Model



Codemao Six Skills Model

Codemao Six Skills Model is by collecting codemao students learning behavior to evaluate students skills levels. Based on the previous research, such as Pearson's personal and social capabilties framework, CSTA K-12, Social Skill Rating system, and 5Cs Model from BNU, we decided to use six dimensions to evaluate students skills at CODEMAO, including: communication, creativity, apply, critical thinking, learning virtual and focus.

Codemao platform data collecting process



Online Course Data Collecting Process

Communication

Conversation between student and teacher

DATA SOURCE:
student total_wechat/
student_wechat_per_course/
per_student_text/
per_student_audio/
per_student_positive_emoji/
courtesy/positive emotion/
communication/ react time/
per_student_negative_emoji

Critical Thinking

Computational thinking and problem solving behavior during the class

DATA SOURCE:
Completeness/problem solving/ avg_course_time/
avg_question/
bcm_completeness/per_course_pass/Challenge_pass/bcm_problem_time/
post_reply_num/total_student_feedback

Focus

Whether students will be distracted by others factors

DATA SOURCE:
window_focus_rate/
pause_per_video/
maochat_per_course/
unfocus_times_per_course/
react time

Learning virtue

Whether students will be distracted by others

DATA SOURCE:
courtesy/
per_course_pass/
praise_others_num/
collection_num/
late_time

Apply

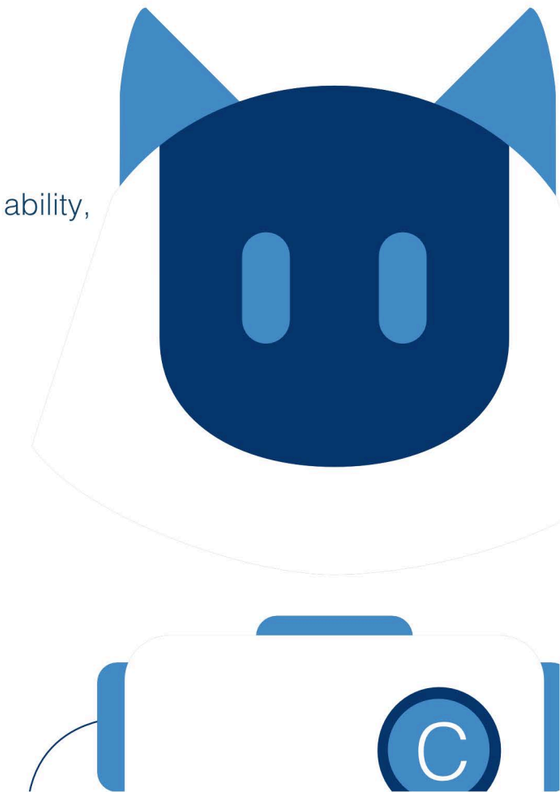
Whether students could apply their skills after class

DATA SOURCE:
total_self_descritpion/
avg_view_time
avg_prasise_time
avg_publish/
Challenge_pass/
total_babel_use/
babel_pass/
total_babel_score

Creativity

Art related behavior ,story-telling ability, curiosity

DATA SOURCE:
new_puzzle/
Challenge_pass/
completeness/
total_babel_use/
total_text/material_per_course/
painting_focus_rate/music_focus_rate/pop_val/
words_num

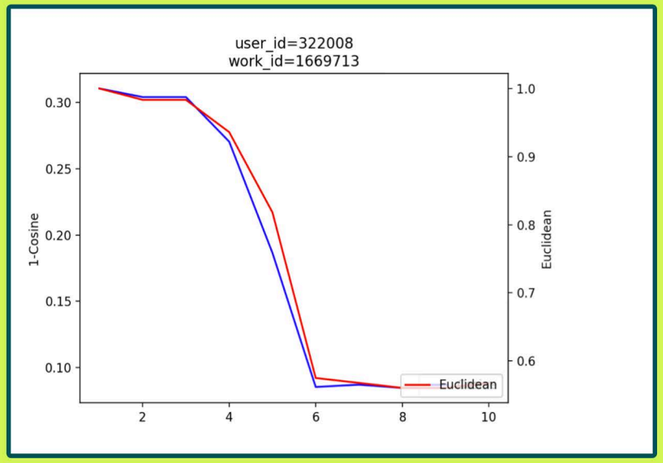


BCM Comparison Model

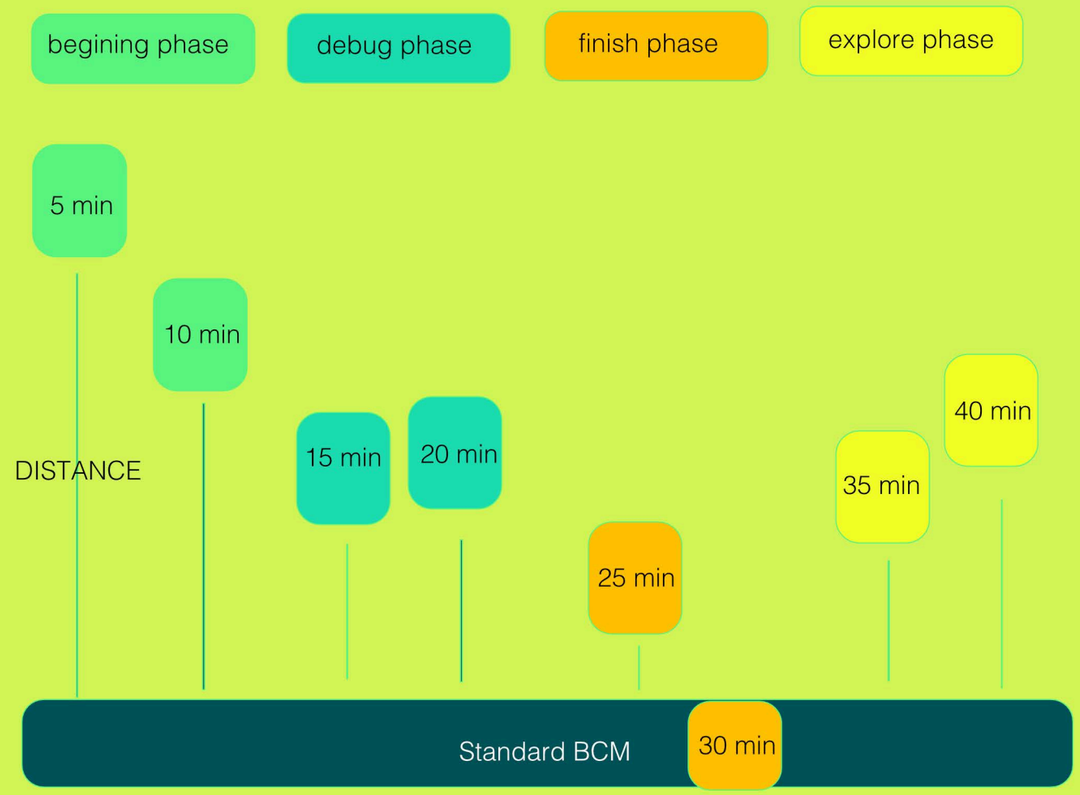
Based on the previous open day research and interviews, we discovered that students will try to achieve the requirement of each class, in other words, students will follow the video instructions to finish their project. Students' own programming (BCM file)will become more and more similar to the Standard BCM file(Standard BCM : the final result of each course) over time. Developing the BCM comparsion model could help us better understand student learning curve of each class every time.

BCM similarity： Euclid distance and Cos distance

BCM files actually is json files. Analysing BCM files , we could see the components of each student programming, after decoding the BCM fileswe could transform them into json format. Similarity between Student BCM files and the Standard BCM file could reflect student study status, the plot below shows the" Ideal Curve " of learning to code in Codemao Platform.(Smaller means more similar to the standard BCM)



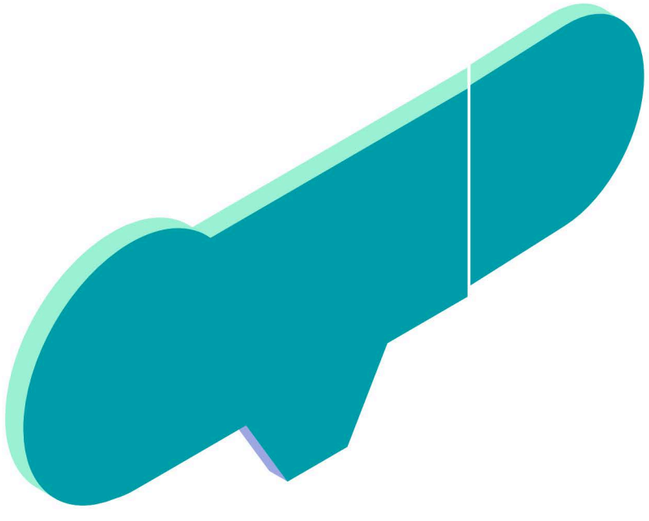
Ideal learning curve diagram



Student Trail Class Report

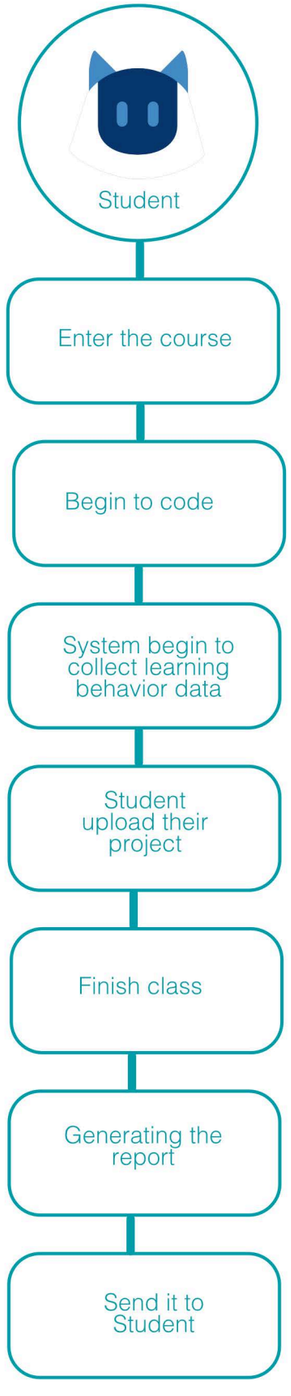
Student Trail Class Report is the first product that apply our previous skills model research into the codemao platform for over one million students to use.

The purpose of Student Trail Class Report is to evaluate our students' skills levels when they frist use our product as well as to help teachers to understand studnet needs in the following class.



CODEMAO

Trail class report workflow



Student Trail Class Report

Home page

Title: AI ASSESSMENT, CODEMAO TRAIL CLASS REPORT

Overall Performance:

Select the best scores from six skills

Class information: class name, pass, finishtime

Next Page

Six skills model

The result will become more accurate as user to use

Level of each skills: B， B+， A， A+

Study suggestion

Learning Curve

Learning curve present the study condition of student during the course

Credits

Yue Sun, CTO, CODEMAO

Tianchi Li, CEO, CODEMAO

Dr Jin Li, Professor, Brown University

Lingfeng Cui, AI Product Manager & Researcher, CODEMAO

Kylee Hench, AI Product Manager, Brown University

Dr Zhicong Liang, Algroitm Engineer, HKUST

Yuze Ma, Engineer, CODEMAO

ZhiFeng Wang, Front-End Developer, CODEMAO

YanZhu Zhuo, Front-End Developer, CODEMAO

Hong Hu, Engineer in Test, CODEMAO

Mengdi Wang, Product Manager, CODEMAO

Lang Tang, Product Manager, CODEMAO

Hao Lu, IT Director, CODEMAO

Dr Li Xia, Advisor, CODEMAO

XiaoHong Deng, Advisor, CODEMAO

Chuang Jiang, Designer, CODEMAO

ZhenLin Chen, Designer, CODEMAO

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