

Problem Statement

The current system isn't built for the individual student but the "average student", but the average student does not exist.

Design Challenge

"Design a tool that enables VMBO students at school or/and home to personalize their form of education and learning methods to keep them motivated to fulfill the mandatory system learning goals."

Our concept: 2Be

Summary

2Be is a tool that helps the individual student learn in their way, helps them achieve their goals, and gives them the support that they need who they want 2be. Teachers can use 2Be to see relevant data about the classroom and spot students who might be having issues with learning or any other issues within the classroom, also allows extending the learning space as much as wanted to take advantage of each other's talents. 2Be is designed to support students and teachers to fulfill the mandatory system learning goals in an interactive and personalized way while also impacting their motivation and self-perception.

The 5 layers of 2Be

1. Subject clarity

- a. *Giving the students insight into what a subject really is about. Helping the student with questions about these subjects and let them be curious and discover what a subject can achieve later in life.*
- b. *Giving the student as many options to choose from as possible so they can create their own package of subjects that fits their needs.*
- c. *Presenting the subjects in a way that gets students involved in the subject matter and allows them to get enthusiastic about learning more.*

2. Goal setting

- a. *Students are setting their own goals in 2Be. These are an addition to what they already must learn.*
- b. *After the year, students will receive a certificate of their completed goals and soft skills.*

3. Learning methods

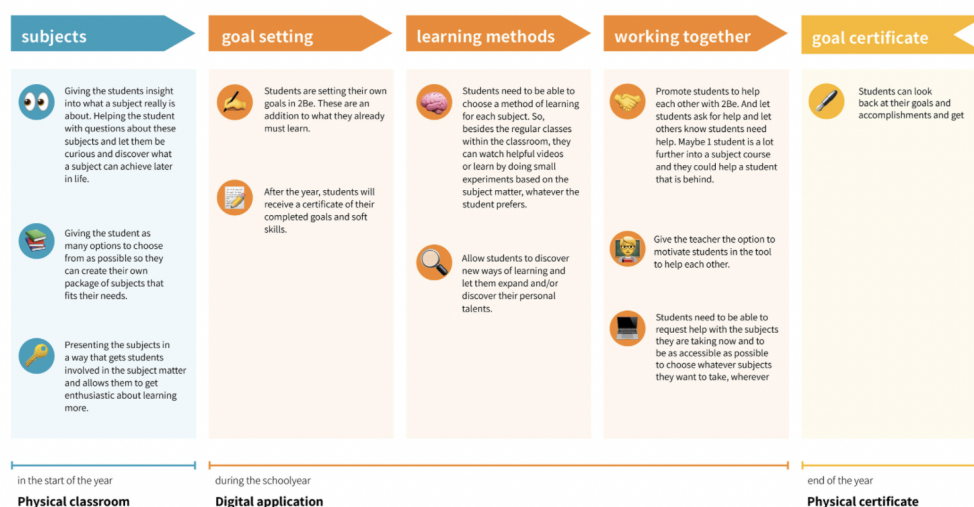
- a. *Students need to be able to choose a method of learning for each subject. So, besides the regular classes within the classroom, they can watch helpful videos or learn by doing small experiments based on the subject matter; whatever the student prefers.*
- b. *Allow students to discover new ways of learning and let them expand and/or discover their personal talents.*
- c. *Giving the teacher the possibility to add upon the existing learning methods when they create or discover new methods of learning the subjects – for example, when a specific explanation really seems to help students in the classroom, they can upload it to 2Be and give all the students access to this explanation.*

4. Student collaboration

- a. *Promote students to help each other with 2Be. And let students ask for help and let others know students need help. Maybe 1 student is a lot further into a subject course and they could help a student that is behind.*
- b. *Give the teacher the option to motivate students in the tool to help each other.*
- c. *Students need to be able to request help with the subjects they are taking now and to be as accessible as possible to choose whatever subjects they want to take, wherever possible.*

5. Achievement

- a. *Students can look back at their goals and accomplishments and get a certificate.*



Context

Research

Students

- [The Psychological effects of having more choices in secondary school](#)
- [Importance of goal setting](#)

Teachers

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- [The downside of being a teacher](#)
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Appendix

Teachers stress

Teachers play a critical role in shaping the lives of our nation's children. Teachers not only facilitate learning but also influence a child's social and emotional development. Today, teaching is one of the most stressful occupations in the U.S. High levels of stress are affecting teacher health and well-being, causing teacher burnout, lack of engagement, job dissatisfaction, poor performance, and some of the highest turnover rates ever. Stress not only has negative consequences for teachers, but it also results in lower achievement for students and higher costs for schools.

- Job Demands that are escalating with high-stakes testing, student behavioral problems, and difficult parents;
- Teacher Social and Emotional Competence to manage stress and nurture a healthy classroom.

Interventions to help reduce teacher stress fall into three broad categories:

1. Organizational Interventions – An approach that focuses on changing the organization's culture to prevent stress from occurring;
2. Organization-Individual Interface Interventions – An approach that includes building workplace relationships and support;
3. Individual Interventions – An approach that teaches individuals practices to manage stress. Several programs and policies are proven to help teachers reduce stress, improve well-being and student outcomes, and even save schools money.

These include:

- Mentoring and induction programs for beginning teachers can improve teacher satisfaction and retention, as well as student academic achievement. (Organization-Individual Interface)
- Workplace wellness programs have resulted in reduced health risks, health care costs, and absenteeism among teachers. (Organization-Individual Interface) 1 Social-emotional learning (SEL) programs that improve behavior and promote SEL among students also help reduce teacher stress and create more positive engagement with students. (OrganizationIndividual Interface)
- Mindfulness/stress management programs can help teachers develop coping and awareness skills to reduce anxiety, depression, and improve health. (Individual)

<https://www.prevention.psu.edu/uploads/files/rwjf430428-TeacherStress.pdf>

Connection with students

Know your students' learning strengths

While one student might excel in arts and creative subjects, their best friend at school might find that maths, sports, and science are more suited to their skills. American developmental psychologist Robert Sternberg's theory of intelligence holds that humans typically excel in one of three types of intellect, so teachers are likely to see all these among their students. They are:

- **Practical intelligence**

This is also called 'street smarts. Students who are high in practical intelligence will have plenty of common sense and be able to adapt quickly to changing environments. These students like to play to

their strengths and minimize their weaknesses. They are the students who get the job done and like to be involved in tasks.

- **Creative intelligence:**

Students who are high in creative intelligence excel at tasks that require invention, creativity, discovery, and imagination. These students are great at offering thought-provoking ideas and participating in classroom discussions.

- **Analytical intelligence:**

Students who are high in analytical intelligence are great at tasks that require planning, critical thinking, and analysis. These students are gifted in terms of their logic and information-processing ability. They are often more studious than they are imaginative and love to digest new information.

Provide students with opportunities to explore key interests

Understanding your students' interests will help you to provide them with quality learning opportunities. By allowing them to explore areas they are interested in – for example, the environment – they will be more likely to engage with the learning process.

It's important not to assume that just because a student excels at a particular subject, sport, or creative endeavor, this is their passion. Give your students time and opportunities to explore their interests and to discover what they truly love to do, so they can develop their knowledge and the skills needed to succeed in the areas they are passionate about.

<https://schools.au.reachout.com/articles/why-its-important-to-understand-student-needs-and-interests>

The work teachers do

Teachers are more likely to work on a Sunday than were other full-time professionals. Fifty-one percent of teachers worked on an average Sunday, compared with 30 percent of other full-time professionals.

[\[PDF\] bls.gov](#)

Downsides of being a teacher

A participant commented that 'it's a huge workload, you can't just keep putting more and more and more and more and more. Something's got to give. One teacher felt as though 'to have the best come from the students you've also got to look after your staff and teachers, and by working them to the bone, to the point of breaking, I don't see that as beneficial at all'

Two other teachers discussed pressures to provide personalized learning plans, thus requiring additional workload in terms of accessing technology-based assessment data

[\[PDF\] sagepub.com](#)

The Psychological effects of having more choices in secondary school

Choice stress

In their third year, HAVO/VWO students need to choose their profile. At the end of their secondary school journey, they need to make a choice to either go work or continue studying at a MBO/HBO/VO level. Both of these choices are heavily influenced by stress, as a lot of the students simply don't know what they want yet. They're very young and don't really know what they want to do yet, but this choice affects their whole professional life. That's very overwhelming and thus it causes a lot of stress among students. Because they're rushed into a decision, their choice is less likely to be the correct one for them in the long run.

<https://www.trouw.nl/nieuws/student-en-scholier-zijn-gebaat-bij-het-niet-weten-b24a230f/>

A survey with 146 respondents suggests that generally students with a higher level of education are more likely to experience choice stress than relatively low level students. This is caused by their living situation, sense of maturity and social pressure. However, students with lower education levels definitely experience choice stress too, just with different themes. They tend to be more stressed about partners, housing and children whereas the other group stresses mostly about their choice of study and their career.

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjG-Pfw0NXzAhUb_rsIHcCNBdcQFnoECAIQAAQ&url=https%3A%2F%2Fscripties.uba.uva.nl%2Fdownload%3Ffid%3D609543&usg=AOvVaw16XtuTyQHahX03wHKQGPZw

Students tend to choose the more broadly applicable option out of fear or making the wrong decision. They choose certain subjects and studies because "you can do a lot with it down the line". They feel stressed out and really don't want to be stuck to their decision just yet, so they pick an option they might not even be interested in to give themselves more time.

There is also a whole discussion of choosing for passion or for money, and both sides have a lot of supporters.

<https://www.motivaction.nl/kennisplatform/blog/de-druk-op-generatie-z-meteen-goed-kiezen-tussen-a-l-die-opleidingsmogelijkheden>

More research into the mental health of secondary schoolers from the National Institute for Public Health and the Environment (RIVM) suggests that girls are more prone to emotional problems, whereas boys are more prone to behavioral problems.

The students have various stress-inducing problems they face:

- The perfect image
Being good looking, successful, healthy, well-traveled, having many friends, etc etc.
This is amplified by social media, where everybody attempts to be perfect.
- Not wanting to disappoint
They feel pressured by parents to do their best, and failing something feels like bringing shame to the entire family. They also expect more from themselves.
- Doing everything right the first time
Making mistakes (or the wrong choices) is a waste of precious time. Often they compare themselves to their peers and almost feel like it's a competition. Making the wrong decision means you're behind where you should be.
- Good performance is rewarded

Doing better than the rest gives you lots of praise, while being average or below doesn't get you much attention at all. Because performing at your highest educational standard has become the norm, it creates the idea that MBO is somehow 'lesser'. It creates insecurity by making students feel as if being themselves isn't good enough.

- Tension and worries at home

Illness, arguments, divorce and financial problems of parents also cause stress. Students generally feel a strong loyalty towards their parents. Worries about money also seem like a big source of stress. Not having much money to spend leads to shame, and many participants admit they aren't always honest about money with their friends because they don't want to be viewed negatively.

- Worries about global problems

The media are a continuous stream of information about everything that's going badly in the world. Climate, wars, safety, animal cruelty and world leadership put pressure on the faith in the future and leads to feelings of powerlessness.

- Restlessness

Students feel like they constantly need to be busy with something. If they feel calm, that must mean something is wrong. Feeling like you're busy and doing well is a nice feeling. However this leads to students piling up too many things at once, leaving no space for any kind of relaxation. Even in their relaxation, they're worried about others and the 'perfect image' they aren't fulfilling at that moment.

- Lack of true contact and feelings of social insecurity

Friendship is important. Having many contacts on social media gives the pressure to respond in a timely manner. However it can also feel lonely if nobody seeks contact with you. Gossip and bullying makes students feel unsafe sometimes and makes them hesitant to trust anyone around them. People talk all the time and you can't simply deny things - there's always proof that you did or didn't do something.

- Desire for support

Not being able to share their worries and not being taken seriously whenever they do makes them feel lonely and like they're all on their own in the world.

https://www.rivm.nl/sites/default/files/2019-05/011281_120429_RIVM%20Brochure%20Mentale%20Gezondheid_V7_TG.pdf

Importance of goal setting

“Goals help students to focus upon the journey to a collection of set achievements, meaning they allocate their resources and time more efficiently and can access motivation during times when they may feel like giving up.”

Importance

- Goals keep students moving forward
- Goals break down insurmountable mountain
- Goals hold students accountable
- Goals makes students want to be better
- Goals prepare students for adulthood

<https://armyandnavyacademy.org/blog/why-setting-goals-is-important-for-students>

“Setting and tracking goals helps your child learn important life skills such as planning, organization, and time management while also building communication skills, self-awareness, and confidence. Creating and tracking goals is a great way to understand your child’s current academic standing and allows you to focus on determining direction for the future.”

Why use goal setting?

- Provides a clear path to success
- Teaches time management & preparedness
- Increases motivation
- Measures Progress
- Gives focus and purpose
- Boost self-confidence
- Provides challenges

<https://gradepowerlearning.com/importance-of-goal-setting-for-students/>

Student requirements

Differences in education level

VMBO

VMBO is a preparatory middle-level applied education that lasts 4 years from age 12 to 16. VMBO consists of 4 different levels differ in the ratio of practical and theoretical education. (Ministerie van Onderwijs, Cultuur en Wetenschap. 2021b, augustus 24. Hoe zit het vmbo in elkaar?) (Education in the Netherlands. 2021, 30 July. In Wikipedia)

- Practical education – which consist of mostly practical education it’s created for student who might not be able to get a VMBO diploma otherwise this is mostly working while learning at a job. Which sends them to the job market directly.
- BB (Basic profession-oriented learning path) – consists of mostly practical education more then 12 hours of practical education and the theoretical education is at a lower level then KB, GL and TL
- KB (Middle management-oriented learning path) – consists of the same amount of practical and theoretical education. It’s around 12 hours of practical education a week and also the theoretical education is on a lower level then GL and TL.
- GL (Mixed learning path) – is a mix between KB and TL. But is almost the same as TL but with some more practical education around 4 hours a week. it is probably getting mixed together with TL as one path.
- TL (Theoretical learning path) – Mostly consists of theoretical education and prepares students for middle management position and the MBO (Vocational education). But also gives the students the option to go to HAVO

HAVO

Unlike VMBO, HAVO (higher general continued education) has some more requirements for entry and in the end the school make the decision to allow student to enroll into their program. This lasts 5 years from age 12 to 17. (Ministerie van Onderwijs, Cultuur en Wetenschap. 2021, 24 augustus. Hoe zit de havo in elkaar?) The requirements are as followed:

- The school advice from the elementary education
- The final test results from the elementary education. (Ministerie van Algemene Zaken. 2021, 7 July. Toegestane eindtoetsen basisschool) This was the Cito-test but now schools have 5 choices:
 - o The central exam from “College voor Toetsen en Examens” (CvTE).
 - o ROUTE 8
 - o The IEP Test
 - o The Test
 - o The AMN Test
- A admission test from the school themselves

The first 3 years for HAVO are considered as “basis formation” were all students follow the same subjects. And for the last 2 years they follow a smaller amount of mandatory subjects but they can choose from 4 profiles. Which come with their own mandatory subjects. HAVO prepares you for HBO (Higher education) (Education in the Netherlands. 2021, 30 July. In Wikipedia)

VWO

The same as HAVO, VWO (preparatory scientific education) has some more requirements for entry and in the end the school makes the decision to allow students to enroll into their program. This lasts 6 years from age 12 to 18 (Ministerie van Onderwijs, Cultuur en Wetenschap. 2021c, september 3. Hoe zit het vwo in elkaar?) The requirements are as followed:

- The school advice from the elementary education
- The final test results from the elementary education. (Ministerie van Algemene Zaken. 2021, 7 July. Toegestane eindtoetsen basisschool) This was the Cito-test but now schools have 5 choices:
 - o The central exam from “College voor Toetsen en Examens” (CvTE).
 - o ROUTE 8
 - o The IEP Test
 - o The Test
 - o The AMN Test
- A admission test from the school themselves

The first 3 years of VWO every student needs to follow the same mandatory subjects except for the 2 modern languages with students can choose from. VWO can also be divided in atheneum and gymnasium. The last 3 years the student get more subjects and gymnasium students get the mandatory subjects Latin and Greek as well. Students can also choose from 4 profiles. VWO prepares students to enroll in Higher education and university. (Education in the Netherlands. 2021, 30 July. In Wikipedia)

Subjects based on education level

VMBO

Subjects

Subjects first 2 years:

- Dutch
- English
- Math
- Calculus
- Math
- People and nature
- Social studies
- Arts
- Physical education
- 2nd Language (Basic profession-oriented learning path excluded)

Also subjects that school pay attention to:

- Geography
- History
- Economics
- Physics and science
- Biology
- Welfare
- information science
- Technology
- Music, design, drama and dance

Note: this depends on the school and level with the VMBO. It seems to differ from school to school for the first 2 years.

Mandatory subjects last 2 years:

- Dutch
- English
- Social studies
- Physical education
- Arts

Profiles for last 2 years and the mandatory subjects:

- Construction, Living and interieur
 - o Math
 - o Physics and science
- Production, installation and energy
 - o Math
 - o Physics and science
- Mobility and transport

- o Math
- o Physics and science
 - Media, Design and IT
- o Math
- o Physics and science
 - Maritime and technology
- o Math
- o Physics and science
 - Care and welfare
- o Biology
- o Math, Geography, history or social studies
 - Economics and entrepreneurship
- o Economics
- o French, German or Math
 - Catering, Bakery and recreational
- o Economics
- o French, German or Math
 - Green
- o Math
- o Physics and science
 - Services and products
- o Math, economics, Biology or physics and science (choose 2)

Besides these mandatory subjects students need to choose 1 free subject. This can be almost anything the school offers. (Welke vakken krijg je op het vmbo en de mavo? 2020, 15 januari. OCO) (Ministerie van Onderwijs, Cultuur en Wetenschap. 2021b, augustus 24. Hoe zit het vmbo in elkaar?)

Graduate

Nowhere it says how many subjects are mandatory for the exams in VMBO.(Ministerie van Algemene Zaken. (2021b, augustus 10). Waaruit bestaat het vmbo eindexamen?) But by looking at the mandatory subjects from the last 2 years and the profile a students chooses those subjects are part of that students exam. Each subject can consists of 2 or more tests. Which can be oral, practical or written tests.

HAVO

Subjects

Mandatory subjects first 3 years:

- Dutch
- English
- Math
- Calculus
- Math
- People and nature
- Social studies
- Arts
- Physical education
- German and French or 1 other official language

Mandatory subjects last 2 years:

- Dutch language and literature

- English language and literature
- Calculus (does not count towards end exam)
- Social studies
- Physical education
- Arts

Profiles for last 2 years and the mandatory subjects:

- Nature and technology
 - o Math B
 - o Physics
 - o Science
- Nature and Health
 - o Math A
 - o Biology
 - o Science
- Economics and society
 - o Math A

o Economics

o History

- Culture and society

o History

o A modern language of choice

Beside these profiles students need to choose at least 1 profile subject of their choice to do besides everything else. Students that choose Culture and Society need to choose 2.

(Ministerie van Onderwijs, Cultuur en Wetenschap. 2021, 24 augustus. Hoe zit de havo in elkaar?)

Graduate

For the end exams HAVO students need to pass 7 subjects all other subjects are done during the school year with school tests. Besides this they need to create a school research project.

(Profielwerkstuk havo en vwo (z.d.). Examenblad) This can be about any of the students subjects were the subject hours are at least 320 hours.

VWO

Subjects

Mandatory subjects first 3 years:

- Dutch language and literature
- English language and literature
- 2 modern languages like French and German
- Calculus (does not count towards end exam)
- Social studies
- Physical education
- Arts

Mandatory subjects last 3 years:

- Dutch language and literature
- English language and literature
- Calculus
- Social studies
- Physical education
- Arts

- 2nd language. (for Gymnasium students this is Latin or Greek)

Profiles for last 3 years and the mandatory subjects:

- Nature and technology
 - o Math B
 - o Physics
 - o Science
- Nature and Health
 - o Math A
 - o Biology
 - o Science
- Economics and society
 - o Math A
 - o Economics
 - o History
- Culture and society
 - o Math C
 - o History

Beside these profiles students need to choose at least 1 profile subject of their choice and 1 general subject to do besides everything else. Students that choose Culture and Society need to choose 2. (Ministerie van Onderwijs, Cultuur en Wetenschap. 2021c, september 3. Hoe zit het vwo in elkaar?)

Graduate

For the end exams VWO students need to pass 8 subjects all other subjects are done during the school year with school tests. Besides this they need to create a school research project. (Profielwerkstuk havo en vwo (z.d.). Examenblad) This can be about any of the students subjects were the subject hours are at least 400 hours.

Subject requirements

The CvTE “College voor Toetsen en Examens” (Board for Tests and Exams) is responsible for the exams for all Secondary Educations. This also means that they set the requirements for all the subjects with the education system. For each general subject, profile subject or extra subject they create a Syllabus which describes in great detail the exact requirements for that subject. But does not give mandatory ways for teach students the subjects and their requirements. The goal is that the requirements for every subject is the same for the entire country not to set a specific learning method for a subject.

Conclusion

After doing the research I can conclude that the subjects that a students needs to do is very set into stone by the government. Especially within HAVO and VWO every student almost needs to do the same subjects expect for some minor choices. VMBO is more free in teaching certain subjects to the students but that changes after the first 2 years when they also get mandatory subjects and profiles that don't differ that much from each other with the subjects they require.

VMBO (especially BB and KB) are more focused on the hands on experience and give students the chance to learn by doing. But even with this it is set into stone and each student needs to do the same thing.

A major result for the research is that the only thing mandatory within with school system is the subjects and the requirements that the subjects have to pass the exams. (the exams are created with the requirements from the subjects) As long as the student knows the same things at the end of their school years. This gives us as a group a lot of freedom to look into way of teaching and maybe a more personal way of teach from student to student. So that even students who would not have passed in the current education system can still learn through other means and pass their exams. As an example for VMBO the tests can be oral, practical or written tests.

I recommend looking into ways of teaching a subjects and giving the subjects on these schools. As long as the student learn the things they have to learn then it is fine.