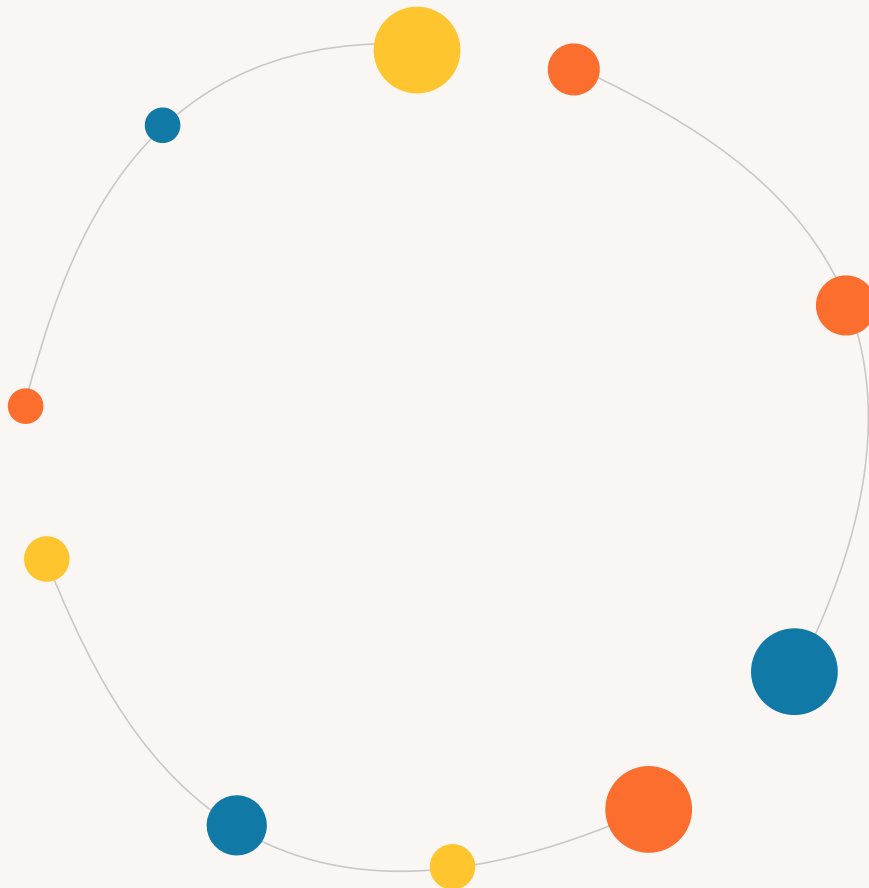
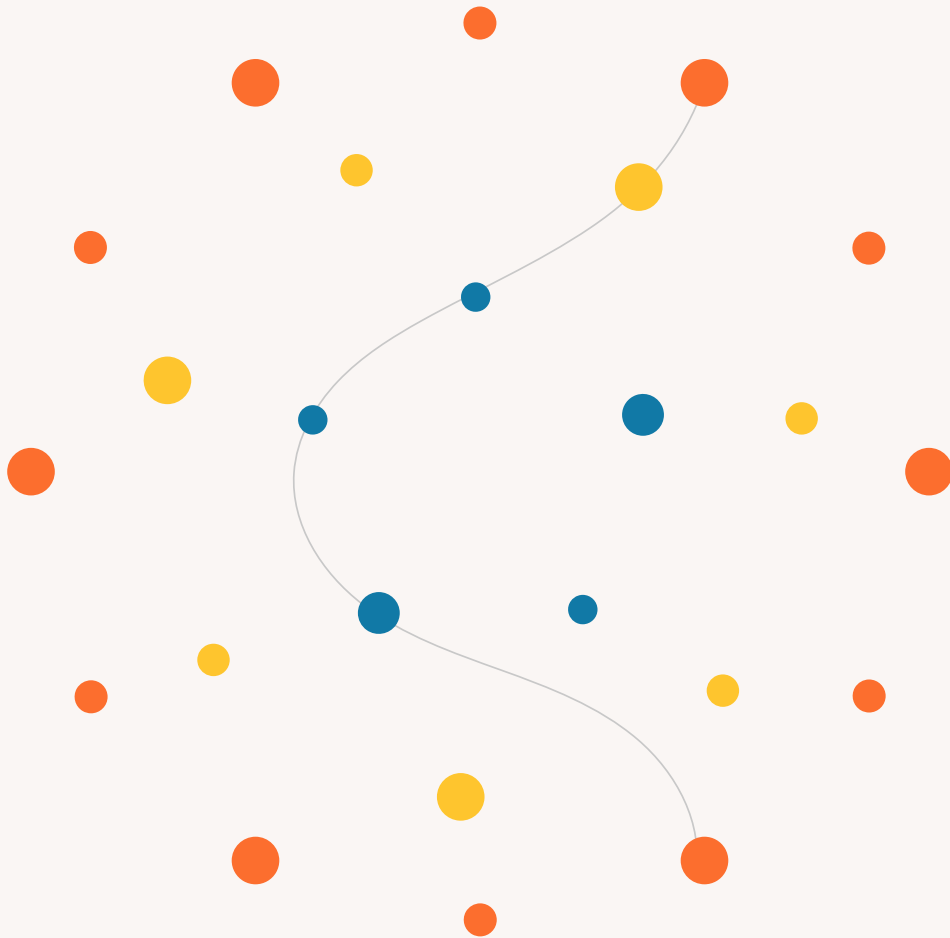


cadra

Digitally Assessing Cognitive Adult Development with StoryMatcher

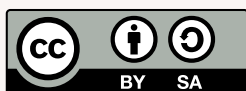
Rainer v. Leoprechting, Kira J. Cooper, Josef Kirchengast





What is CADRA?

The CADRA project is a three year Erasmus+ co-funded initiative, running from December 2020 until August 2023. It explores leadership needs leadership development and focusses on delivering working tools and methodologies to help leaders navigating the challenges of our times.



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Summary

This report summarizes the developments of the StoryMatcher tool through the CADRA project. The main outcome is the first level validation of StoryMatcher as a measure of adult development along the scale of Robert Kegan. StoryMatcher is the first application that can claim this. We introduce the need for such a measure in our times, the developmental system of Robert Kegan, the way the StoryMatcher works, and how we conducted the comparison between subject-Object interview results with StoryMatcher outputs. Based on the encouraging findings we conclude that the StoryMatcher application can well facilitate life enhancing searches for new work opportunities, friendships and life partners, and coaches, mentors or learning programmes.

1. Introduction

1.1 Why good leadership is urgently needed and an invitation to explore

Effective leadership is foundational to the successful function of organisations. Historically, leadership and organisational management was very localised and tended to react to more gradual or smaller scale shocks. With the intensification of globalisation, issues that were once locally contained now have broad scale implications.

Skillful leadership is no longer a luxury, but rather a necessity for the survival of an organisation. It is also important to recognize that the management skills, capacities, and approaches that served leaders in the past are no longer sufficient to address the increasing volatility, uncertainty, complexity, and ambiguity (VUCA) that characterise the current times (Stein 2021; Baran and Woznyj 2021). The CADRA project clearly recognises these challenges and advocates for inner development to support progress towards collective wellbeing.

Within the context of this project, we demonstrate that inner development is a profound leverage point for shifting how individuals show up in the world. This approach is complemented by a rich and emergent body of transdisciplinary literature that spans everything from the arts, sciences, and humanities (Wamsler et al., 2021; Ives et al., 2020; Woiwode et al., 2021). Part of the impetus for the change of mindsets, worldviews, and belief systems that we and others are advocating for is to help individuals move towards more social and ecologically just ways of being in the world. Within the context of this project specifically, we are interested in how inner transformation can effectively support the operation of organisations in service to both people and planet.

Throughout the CADRA project, we demonstrate that leaders *can* and *must* cultivate new skills to make sense of the complex and multi-dimensional challenges that they are faced with. Additionally, they need to nurture new ways to effectively communicate these findings with their teams. For over three decades, the study of “adult development” has explored how people transition to higher stages of development across their lifetime; from infancy to adult. This includes becoming more self-aware, self-reflexive, and skilled at managing interpersonal relationships.

The primary goal of the CADRA project is to make these insights more accessible so they can be applied in domains such as organisational or political leadership so they might support collective flourishing. In this report, we focus on the development of the StoryMatcher program – an online self-assessment instrument that measures individual and organisational development. This developmental measure is of immense benefit for supporting recurrent processes of organisations such as recruitment, talent and retention, research and development, and the creation of working or learning groups.

This report is both a report on our findings, as well as an invitation to explore the use of StoryMatcher. We offer the StoryMatcher as a free self-exploratory program on the cadra.li website.

1.2 What is the StoryMatcher?

The StoryMatcher™ is an online self-assessment instrument designed to measure individual and organisational development. As such, it serves as a service for social platforms to help users to find content that corresponds to who they want to be in some future, or providers of content to find a relevant audience that is intrinsically motivated. From a practical perspective, the StoryMatcher offers users of such platforms a way to assess their own development through narrative selection. Through our proprietary process, individuals are able to select from a series of vignettes that serves as a proxy for identifying meaning making and aspirations in terms of their career or as a person in general. The scenarios themselves serve as a matchmaker between the individuals and opportunities for their personal futures, including jobs, learning and development, or connecting with other individuals as mentors, friends or partners.

Based on an original development from Rainer von Leoprechting, all rights of the process and the software developed are now held by pro action learning Ltd., which offers the StoryMatcher as a service to social platforms, mainly in the field of career development.

The StoryMatcher is currently offered in three languages: English, French, and German, and can be accessed here:

- English: <https://fraendi.shala.us/circle/cadra-io6-storymatcher-63443a7a69eb3>
- German: <https://fraendi.shala.us/circle/caia-academy-64493ed638943>

- French: <https://fraendi.shala.us/circle/cadra-io6-storymatcher-en-francais-64df977c62d64>

1.3 Developments in CADRA

The CADRA project was primarily focused on developing the StoryMatcher as an online assessment tool for adult development. The CADRA team learned to facilitate and host story listening circles to elicit fresh incidents of success from a variety of individuals across Europe. A dedicated set of scenarios (stories) was curated from these gatherings. Using Kegan's developmental framework (learn more at section 2.2 below), each of the unique scenarios were analysed and scored. The Scoring draws upon the well-established adult development scale (see section 2.2 below).

To make the assessment of individual adult development accurate and accessible, we developed a front-end interface with a platform on Shala.us. This program allows individuals to select a series of success scenarios that resonate with their experience, from which an aggregate developmental score is assigned. Upon completion of the StoryMatcher process, individuals receive a specialised report that summarises their developmental situation in life based on a hybridised assessment of Kegan's developmental model as informed by the StoryMatcher.

The StoryMatcher has been tested in three case studies in Europe and Indonesia. When comparing the Kegan subject-object evaluations with the StoryMatcher findings across this series of 3 case studies, we demonstrate that the StoryMatcher is an excellent proxy measure for the individual's position in their life-long adult development trajectory. (For more information on the scientific rigour informing the development of the StoryMatcher, see section 3).

1.4 The CADRA developments

The StoryMatcher self assessment is accessible with desktop and mobile devices. In addition to the Shala platform, where the self assessment is already fully implemented and ready for use, we have also made the StoryMatcher available as a plugin for an integration on any social platform or website where the self-assessment could be accessible then. Webmasters can download the plugin under an open source software licence [here](#). After having integrated the plugin on their own website, users are able to connect with the scenarios provided in the background and to use the self assessment tool on their own website or platform. Technically, the link to the scenario

collections held in a back-end database is established by API access and the plugin is provided as React iframe.

StoryMatcher and its underlying technology allow everyone to bring developmentally informed services into the digital age. Whereas in the past developmental assessments were inaccessible because of time cost, and the need for trained professionals to host the interviews, the self-service nature of the StoryMatcher makes the process widely more available and scalable at very low marginal cost.

Building on this, many new applications of adult-developmental theory can be developed and offered at reasonable prices, and at scale. This could include new versions of StoryMatcher for further interpretations stemming from scientific models, or new search and matching services, where developmental hypotheses can be tested and built upon.

In the field of adult learning, we intend to build a developmental learning platform with a learning cohort of Ukrainian social entrepreneurs. Features of this platform would include these developmentally informed services:

- Individuals can do their self assessment and receive immediate feedback;
- Individuals are linked to learning opportunities according to their individual development situation;
- Learning providers who design curricula according to specific capabilities present at given developmental positions;
- Learning providers can select participants based on cognitive development stages and;
- Facilitators can develop learning cohorts that have similar cognitive development capacities. As a consequence, the design and delivery of learning programmes can fully work with these capacities.

2. Research background and development of the StoryMatcher

2.1 Introduction to the StoryMatcher

2.1.1 Origin and impetus of the StoryMatcher approach

Rainer von Leoprechting, CADRA project lead, was in charge of defining the user requirements for a personnel portal in European Institutions in the early 2000s. His primary task was to model staff movements between jobs. While researching portals for recruitment, he found that there were no matching functions that could bring people together according to their “calling” or “aspirations”. Instead, most recruitment selections use data only from the past. To fill this critical gap, von Leoprechting developed a digital matching process that could be used across industries to find critical talent that fits the specific workplace culture and the often implicit expectations from managers, colleagues or clients. People find a place at work, where who they want to be is also wanted by most of the people they work with every day. The same principle can apply to learning opportunities or the search for new friends and life partners.

As an experienced career coach, von Leoprechting was accustomed to individuals searching for career guidance. One of the most common issues his clients expressed was related to a discontinuity between their aspirations and their current place of employment. For example, a common question he would receive was “I’m no longer happy working here, where should I apply now?” Recognizing this common pattern, von Leoprechting began encouraging his clients to reflect on a moment in their current employment where they felt unusually successful. Based on the stories they shared, he and his clients could quickly and effectively understand how the strengths and motivations demonstrated in this story could be of good use in other workplaces, where the individual could go to apply for their next job. This work with “critical success incidents” inspired von Leoprechting to create an accessible system to help individuals navigate changes within their organisation. As a first project, von Leoprechting brought together a small research team from European institutions to explore various conceptions of success in these diverse work environments. After listening to more than 50 individuals sharing an important moment of their professional life, the EU team summarised and thematically coded the anonymised stories into a collection of possible success experiences

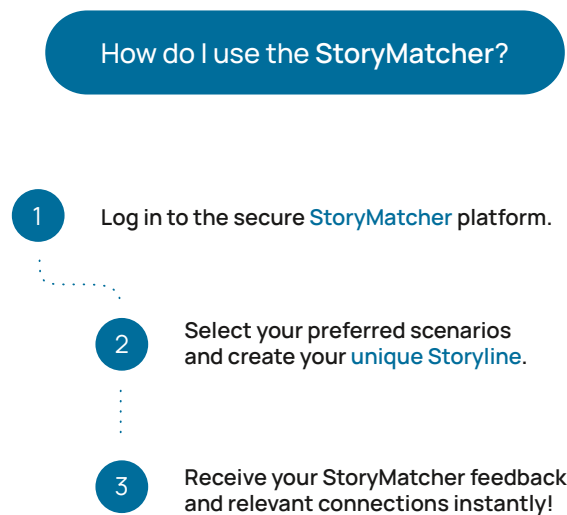
in the EU institutions. This was the first story set summarising the work culture of an organisation done with this method. Since this first project, von Leoprechting continued to collect stories, in which staff from hundreds of companies and organisations express their desired futures or aspirations. The stories are kept in an anonymised StoryMatcher database with hundreds of success moments from real life.

Drawing on his extensive training in adult developmental theory and organisational change, von Leoprechting brought together the works of Otto Laske and Robert Kegan to create a novel developmental framework that would meet the accelerating demands of the rapidly evolving digital age. Through extensive testing, von Leoprechting found that the stories he collected could be effectively analysed and thematically grouped within the development hierarchy developed by Kegan. The StoryMatcher framework is the first model of its kind to use stories as a developmental mapping and matching tool that can link people in real time based on the scenarios they selected, even if they did not select identical scenarios.

2.1.2 Purpose

The motivation behind this development was to offer to more and more people a continuously meaningful experience in their work life, and in their life in general. Once a work role begins to lose its depth, not least because the individual in the role has learned what they could learn in it, it is time to explore new roles rather than get bored in the existing function. Equally, organisations get the best return from their members when they are highly motivated and challenged, learn and develop on their tasks. This gives the reason why organisations would offer their staff continuously new opportunities of work and engagement.

2.1.3 How does it work



1. Individuals are provided with access to a secure digital platform.
2. Once logged in, individuals are provided with a suite of scenarios addressing topics such as success at work. Here they select those scenarios which they resonate with most closely. They choose a total of 4-7 scenarios out of a catalogue of 50 options, which together creates their storyline.
3. Once the individual has completed their story selection, their developmental score is calculated in the background from the scores of each selected scenario.
4. The individual receives results from their Storyline. In the CADRA StoryMatcher, participants are offered three versions of feedback about the success strategies they prefer, and are invited to select the report they feel most accurately captures their experience.

Beyond just applications in the employment sector, we anticipate that the StoryMatcher can be used to help people make informed decisions about travel destinations, romantic partners, learning offerings, etc. In the course of the CADRA project, we were developing the case for learning platforms. We will develop the case with the forthcoming project, in which we support a cohort of young Ukrainian social entrepreneurs with a leadership programme.

2.2 Adult cognitive models

The field of cognitive development was established in the 1900s with the seminal works of Jean Piaget. This constructivist approach to understanding the epistemological evolution of knowledge attested that children construct their own version of reality through a combination of ideas and experiences embedded in social contexts (Piaget, 1963). More recent discoveries in this field have emerged demonstrating that the cognitive development of individuals continues beyond the age of 25, as was originally assumed (e.g., Kegan, 1980; Wilber, 2006; Laske 2006). The most widely recognized approach to adult cognitive development theory (CDT) was developed by Robert Kegan (Kegan and Lahey 2009). Kegan's model proposes five distinct development stages which can be summarised as follows:

Stage 1: Impulsive Mind

The impulsive mind makes sense of the world through interaction with content that is narrowly limited to their impulses, desires, and perceptions. Individuals at this development state are unable to consider oppositional views and approaches, and thus require frequent reminders of rules and expectations.

Stage 2: Instrumental Mind

The instrumental mind is motivated by its interests, needs, and desires, but has an increased capacity to bring multiple data and things into cognitive order to build models of how the world is functioning. Individuals in this stage tend to be self-oriented as they seek to instrumentalise the world to serve their needs, desires, and interests.

Stage 3: Socialised Mind

The socialised mind has matured enough to see beyond narrow self-interests and is oriented to maintaining connection within their social groups. Instead of being exclusively self-oriented, individuals at this stage are foremost motivated to nurture interpersonal relationships and act in a manner that serves the needs of others. Instead of trying to model the behaviours of others, as in the case of Stage 2, Stage 3 individuals can both empathise and respond to the needs of others directly, without a mediating mental model.

Stage 4: Self-Authoring Mind

Building on the capacities from Stage 3, the self-authoring mind has developed its own principles and values that guide its decisions, irrespective of the felt needs or interests of others. Individuals at this

stage are motivated to provide meaningful contributions to interpersonal relationships. Critical at this stage is the ability to empathise and relate to others objectively without confusing their own needs, wants, or agendas with those of others. The self-authoring mind is highly reflexive, evaluative, and responsible.

Stage 5: Self-Transforming Mind

The self-transforming mind has learned how to decouple attachment to their own values and principles so that they can hold various worldviews at the same moment. This increased capacity for dialectic inquiry and systemic thinking increases complexity tolerance, particularly at scales ranging from self → collective → systemic. The self-transforming mind is oriented towards a system of decision making that aligns with what they perceive as beneficial to the collective.

Liminal spaces

Between each of these stages are micro-stages – liminal spaces where the mind is influenced by both the stage before and the stage after. As the tension intensifies, a conflict will ensue between the stages. It is not until a significant breakthrough that the old stage will sufficiently weaken its hold and the mind will mature through another phase of cognitive transformation. As the mind enters the new phase, it will reflexively consolidate outdated cognitive orientations.

The five cognitive stages have been thoroughly analysed for approximately 50 years (Bauger et al., 2020). Kegan's approach to CDT is widely recognised as an effective approach for assessing change processes in adult development. Since individuals express their meaning making processes through dialogue, analysing thought patterns is an effective way to identify an individual's development stage.

2.3 The StoryMatcher design compared with the Subject-Object interview

Kegan together with his colleague from Harvard University, Lisa Lahey, developed a prompted interview methodological protocol called the Subject-Object Interview (Kegan, 1980). This method builds off decades of adult developmental research since the 1980s to-date, and was further refined by Otto Laske (Laske 2005). Benefits of the Subject-Object Interview process include:

1. Accuracy: Through prompting many aspects related to the internal meaning-making process in the individual, a broad

sample builds up, which a skilled analyst can interpret according to the orders of mind described above.

2. **Timeliness:** The interview is facilitated by a trained interviewer who prompts the individual to generate timely reflections and interpretations of their inner meaning-making process.

While the Subject-Object interview method is very accurate in its observations, and even called the “Gold Standard” in adult developmental measurements, it has a number of disadvantages including:

1. It takes a well trained interviewer to actually conduct the interview and lead the dialogue so that meaningful text is produced.
2. The analysis of the text also requires well-trained practitioners who can discern the patterns of meaning-making according to the fine micro stages mentioned above.
3. Those two factors not only make the profiles expensive to operate, they also prevent this measure from being used in large scales.

Where the StoryMatcher differs from other assessment models, including the popular MyersBriggs personality trait survey (Myers-Briggs, 1962), is that it is not designed to define the character or personality “type” of a person but rather their preferred success strategies. These success strategies include their aspirations, meaning making processes, and how they relate to others as well as themselves. StoryMatcher uses the same scaffolding as Kegan’s development model, mapping how the mind relates to others and Self, across a spectrum of adult development.

One of the benefits of StoryMatcher is that it is highly accessible. Consequently, individuals can go through the program as many times as they wish to examine how their meaning-making and inner transformation evolves over time.

In the StoryMatcher platform, individuals are offered a selection of choices from condensed scenarios based on real life narrations. Each of these scenarios correspond to responses prompted in a Subject-Object interview. These scenarios are purposefully rich in context and can therefore be interpreted through various lenses beyond adult cognitive development.

The StoryMatcher evokes a full experience in the test person who is invited to “identify” with the hero in the story. By doing so, the individual signs up for a whole bundle of traits rather than showing

specific competencies or behaviour traits in isolation. Based on this holistic approach, a variety of interpretations are possibly derived from the same dataset. Currently, StoryMatcher is programmed to perform algorithmic sensemaking via Kegan's scale of adult development. However, we see the potential to include other meaning making interpretations and are currently testing their integration. This process is distinct from most psychometric tests that are constructed to measure a specific trait or model in an isolated fashion to ensure the specific quality is present or actualized by the individual. Instead, we take a more complexity-informed approach to data collection. We are evaluating the whole scenario and give a gradual weight to the individual qualities we want to measure. Unlike the Kegan score that selects specific stages, our approach is calibrated to micro-scores, which together inform a proxy value for the model we want to measure. StoryMatcher, much like the Kegan Subject-Object interview process, requires a trained specialist to make sense of the meaning making process as it is demonstrated by the speaker in the interview. The difference is that this specialist input is needed only at the moment the scenarios themselves are constructed. After this, the interpretation can be constructed by an algorithm.

CADRA project lead, von Leoprechting, came to the realisation after training in the Subject-Object interview method for over twenty years, that an online survey process with rich scenarios could effectively capture adult worldview preferences and thus inform an individuals' level of cognitive development. To test this theory, a series of pre-narrated short scenarios about decision-making and work strategies for success were offered in a questionnaire format to study participants. Each unique scenario was assigned a correlating developmental score. The aggregate value of each of the survey questions provided an individual developmental score for the person doing the selection corresponding with Kegan's stages.

The benefits of this approach for quantifying levels of adult cognitive development over other models includes the following:

- Developmental data can be collected without the need for an interview;
- Results of the survey are kept confidential throughout the duration of the entire process;
- Results from the survey are automatically calculated without the need for extensive linguistic analysis;

- This process offers an accurate and low-cost method to accurately assess adult development at scale; and
- So finally, the developmental measures can scale, at a low marginal cost.

2.4 The StoryMatcher assessment process

The assessment process takes the following approach:

1. Individuals are provided with access to a secure digital platform.
2. Once logged in, individuals are provided with a suite of scenarios addressing topics such as success at work. Here they select those scenarios which they resonate with most closely. They choose a total of 4-7 scenarios out of a catalogue of 50 options, which together creates their storyline.
3. Once the individual has completed their story selection, their developmental score is calculated in the background out of the scores from each selected scenario.
4. The individual receives personalised and instant results from their Storyline. In the CADRA StoryMatcher, we offer participants three versions of feedback about their preferred success strategies and invite them to select the report they feel most accurate for themselves.

The results are instantly produced without any manual processing and without the need to have highly trained people available to operate the interview or the subsequent data analyses. It is faster and more efficient than other online methods.

To ensure the accuracy of StoryMatcher as compared to the Subject-Object interview process, we conducted a series of case studies. Our studies revealed that results of the StoryMatcher are very closely aligned to the Subject-Object interview findings. As such, there are many generative areas of application for the StoryMatcher program, especially when the goal is not mainly to “assess” the individual, but rather to offer the person a selection of “meaningful” or “relevant” human connections as well as opportunities for transformative growth or healing.

3. Testing the StoryMatcher

3.1 Overview of the case study and research design

The CADRA project invited people in various leadership positions to complete a developmental leadership profile with a cognitive and social-emotional analysis. The process consisted of two one-hour interviews, one mainly cognitive and the other social-emotional interview conducted in accordance with the standard Subject-Object protocol developed by Lahey and Kegan, with the analytical improvements of Otto Laske (Laske 2006). This hybridised approach created a range of profiles, which were established according to the Kegan cognitive developmental assessment system. The same individuals who completed the baseline profiles also completed profiles with the StoryMatcher selection process. As such, we were able to validate how classic Subject-Object interview results compared to those generated by the StoryMatcher.

For all case studies, it is important to understand that individuals do not operate from a single point in the levels of Kegan's model but rather are active at various positions. When measuring an individual's meaning making processes through interviews, we observe how developmental stages oscillate based on prompts and reactions to specific scenarios. The StoryMatcher takes the same holistic approach. Each individual scenario is associated with a range value, which is later combined to provide a tabulated result. As such, to accurately compare data, one cannot calculate an average or mean, as the levels in the Kegan system are not numbers, but rather express distinct qualities of meaning-making.

In the graphs below we present the mode of each case, or if there are several modes, the middle one from the stage data of the case. In the appendix we show how the full histograms of both the Subject-Object interview scores compare with the StoryMatcher results.

We undertook three separate case studies to elucidate to what extent and how the results of the Subject-Object Interview differed from the StoryMatcher. These case studies included:

- 2022: Comparing 2021 and 2022 cases from CADRA with StoryMatcher scores
- 2023: Comparing 2023 cases from CADRA with StoryMatcher scores
- 2021-22: Comparing Indonesian Researcher prompt scores with StoryMatcher scores (outside of CADRA)

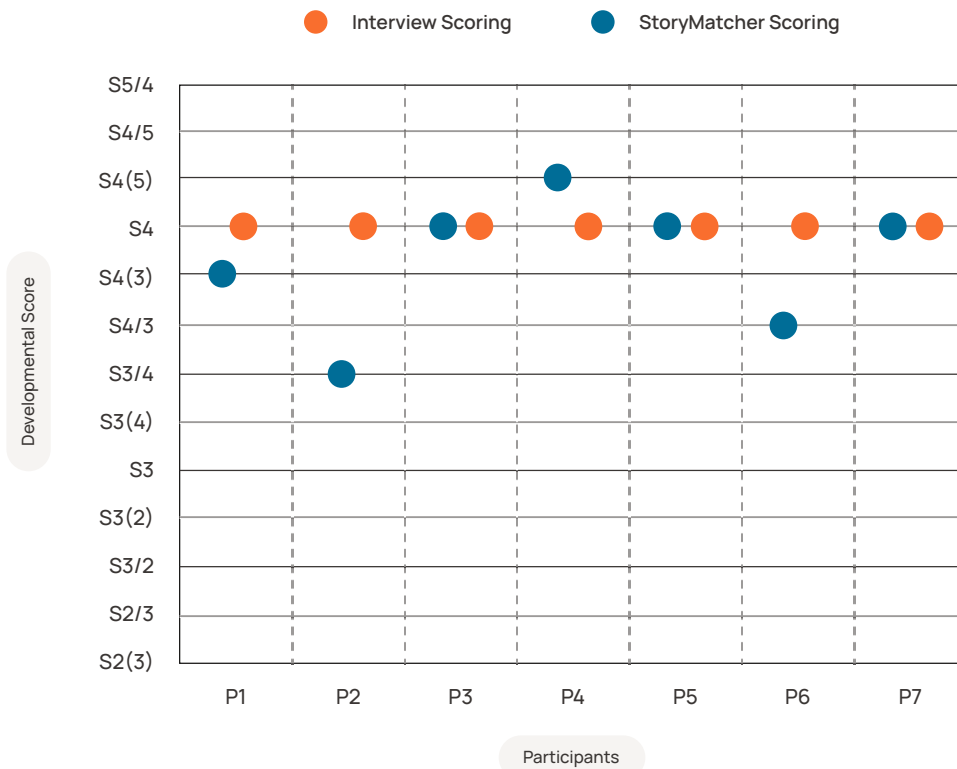
Based on the results of three case studies, we can conclude that the overall distribution of the StoryMatcher results are within the range of the Subject-Object interviews, in most cases with very close or identical modes.

3.2 Case study 1: Comparing 2021 and 2022 cases from CADRA with StoryMatcher scores

For the first case study (July 2021-February 2022), we invited participants from the CADRA leadership profile to take the StoryMatcher with the scenarios we had constructed for the Indonesian scientist leadership programme (Case study 3). Results from the analysis demonstrate that most individuals arrived at the same score, be it from analysis of their interviews or the computed score from their scenario selections. The outlier cases (participants 2 and 6) were with persons who demonstrated a widely distributed range of maturity across the interview. The StoryMatcher values were in that same wide range, even if the central values (modes) differ.

Case Study 1

CADRA cases 2012/2022

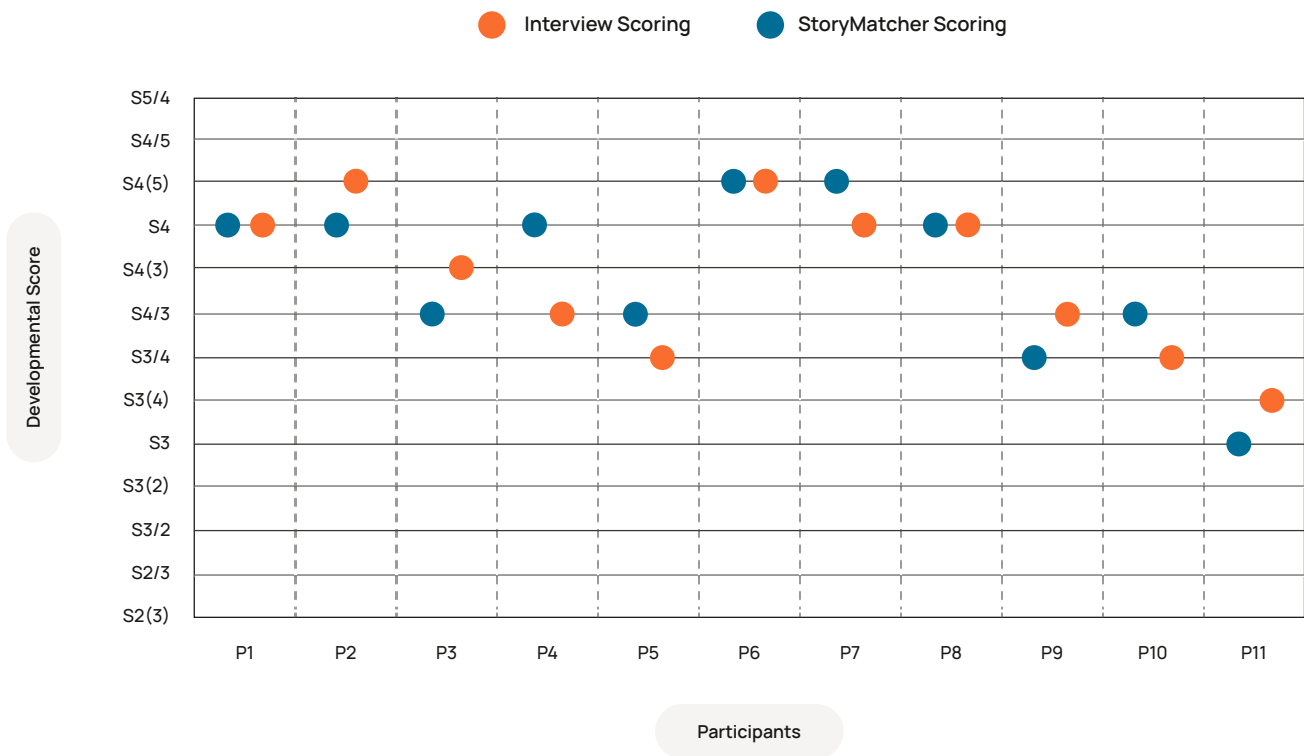


3.3 Case study 2: Comparing 2023 cases from CADRA with StoryMatcher scores

The second case study included participants from the CADRA leadership profile study (February–July 2023). For this case, we updated the StoryMatcher program with a scenario set that we constructed from stories we collected and processed throughout the duration of the CADRA project. Results from this case demonstrate that the new story set works as well as the earlier set from the Indonesian programme. Again, individual results vary minimally between the full interview-based analysis and the results generated from the individuals' scenario selections.

Case Study 2

CADRA cases 2023

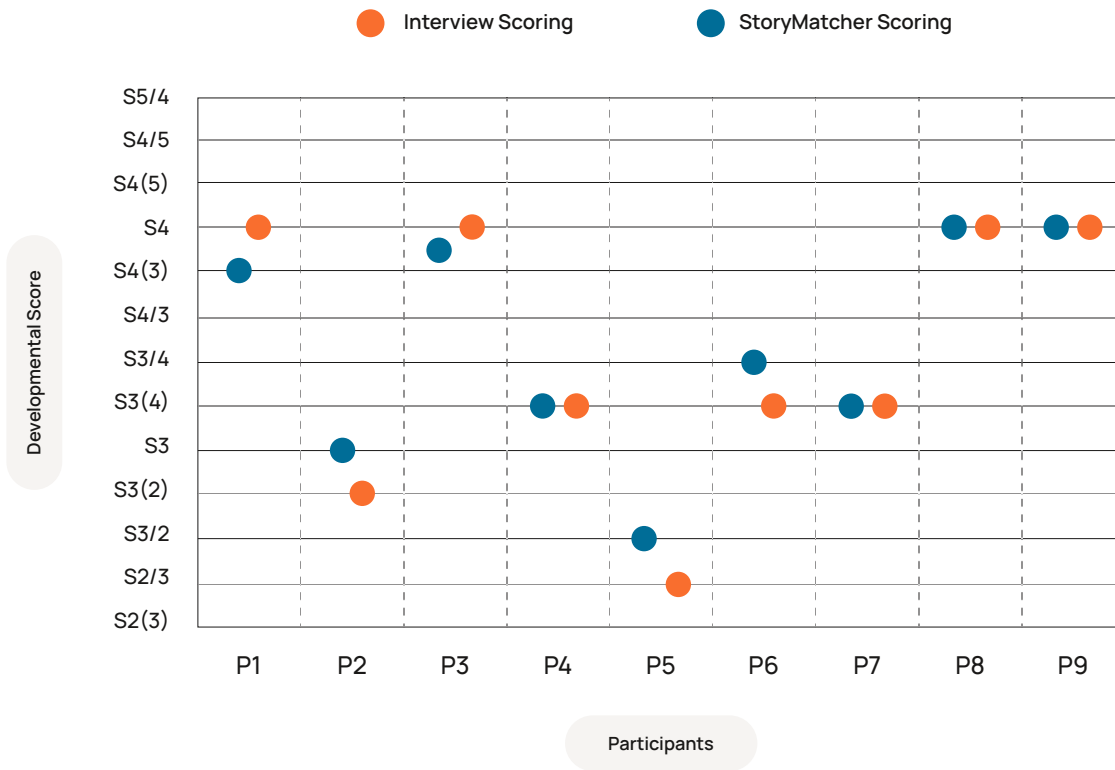


3.4 Case study 3: Indonesian Researchers with Kegan success prompt scores compared with StoryMatcher scores

The third study in our analysis was conducted outside of the scope of CADRA. We had created a story set for Indonesian scientists who were interested in participating in an online leadership programme that was designed by Fraendi and partners in 2020 and 2021. From the actual 29 participants, Fraendi interviewed 9 using the Subject-Object method and the prompt “success”. Their short interviews were analysed and their scores compared with the results from their StoryMatcher process. Results demonstrate that the StoryMatcher results aligned with the verbal expression on “success” from the same individuals. The StoryMatcher proved to be likely to generate an accurate reflection of the inner meaning making of the individuals.

Case Study 3

Indonesian Leadership program



4. Outputs of the CADRA project

In the context of this project and the wider scope of the ERASMUS+ programme's focus on adult learning, we have developed a set of scenarios for a free digital self-assessment tool. The automatically generated feedback reports provide insights for the individuals who take the assessment. Upon comparison of the results from individuals who took the Subject-Object Interview within CADRA and StoryMatcher results we can conclude with the confirmed hypothesis that the StoryMatcher test allows to rather accurately estimate the maturity of individuals according to the scale of Robert Kegan's development model. This is the first such test offering this, and we are looking forward to further scientific research to validate the approach. Thanks to the Erasmus+ funding of the CADRA project, the StoryMatcher can now assess any individuals' adult cognitive development in English, German and French for free. With this important groundwork, many digital applications can now include developmental categories.

4.1 Main deliverables according to project plan

In this section, we report on the software developments made with the StoryMatcher program.

4.1.1 Web-based developmental self assessment

Over the course of the CADRA project, we curated a collection of scenarios that we derived from many story listening workshops with people from different ages, regions and professions across Europe. These collections have been amalgamated into a digital repository that informs the self assessment for individuals along the lines of Kegan's adult development model.

The self-assessment survey using these scenarios is freely available on the CADRA website in English, German, and French. Through the web portal, survey participants are able to select their scenarios and receive an interpretation of the results based on Kegan's developmental model.

- English: <https://fraendi.shala.us/circle/cadra-io6-storymatcher-63443a7a69eb3>
- German: <https://fraendi.shala.us/circle/caia-academy-64493ed638943>
- French: <https://fraendi.shala.us/circle/cadra-io6-storymatcher-en-francais-64df977c62d64>

4.1.2 API Access and technical background

Over the course of the project, we partnered with Shala, a digital technology startup to deploy the StoryMatcher functionalities as part of their learning and community platform models. Shala is a social platform company that provides a shared set of functionalities for their partners to build their own social networks.

The self-assessment function of the StoryMatcher is publicly available on Shala in three languages (the links above) and through the CADRA website. From a technical perspective, Shala provides a user interface (front-end), which connects to the StoryMatcher databases (back-end), which in turn is provided by Fraendi. The StoryMatcher databases and algorithms are hosted on dedicated cloud-based servers under control of Fraendi / pro action learning Ltd. User interfaces could be made available by different platform providers.

The connection between the front-end to the back-end is operated by an API interface. Fraendi offers a REACT plugin to deploy the StoryMatcher data on any front-end. This plugin operates under an open source principle and is continuously updated by its developers and is accessible on any site.

4.2 CADRA project activities

The CADRA project allowed us to further enhance the StoryMatcher program by developing a new story set and testing a number of important StoryMatcher functionalities.

- Between December 2020 and 2022, we hosted numerous story circles with adults in various roles and professions across Europe to collect their individual expression of work success.
- We transcribed, edited and evaluated the stories to create meaningful scenarios, which can be used to establish the developmental position of the individuals through their storylines.
- We validated the self-assessment test with 20 individual assessments based on full Subject-Object Interviews.
- We developed the requirements for online functionalities for learning platforms:
 - Matching individuals with learning programmes based on the developmental position of the individual and the position of the learning offer;
 - Matching individuals with coaches or mentors; and
 - Convening individuals into learning groups.

- To increase data confidentiality, we decided on a three-tier architecture, with a Data Tier in the back-end, an Application Tier at API level, and a Presentation Tier in the front-end. Only the latter is publicly available to customise code for the user interface or to make the appropriate integration into the respective platform and their user management.
- User-specific data is only stored by the platform operators - we do not include any user-relevant data in our back-end databases. Furthermore, we pay attention to strict anonymization when creating the success scenarios.

All software elements available have been tested in the course of the CADRA project.

- The tested API plugin interface is publicly available after the project (plugin app developed in REACT)
 - Documentation and Download area: <https://fraendi.shala.us/storymatcher-app-63443a7a6c786>

4.3. Future applications for supporting learning platforms

One of the main motivations for this project has been to bring adult developmental insights into the day-to-day life of learning professionals and their clients, namely adult learners. Life-long learning is strongly coupled with adult development and is therefore seen as a key mechanism for individual and collective transformation. We hypothesise, based on both evidence from the literature and our own professional experience, that the adult developmental stage of an adult learner has implications for their capacity to learn and to relate to their learning partners and teachers. As such, it is of immense benefit to learning providers to understand the developmental position of both their teaching staff and their learners. Accordingly, our digital measure of adult cognitive development provides vital insights and benefits for enhancing learning in these contexts.

With the features from a StoryMatcher service, we envisage digital learning platforms will be able to:

- Present learning opportunities to individuals that match their developmental position;
- Match individuals with mentors or coaches so that a mentor/coach will systematically hold a wider mindset than their coachees;

- Support the creation of learning cohorts or peer learning groups that are developmentally aligned; and
- Interpret evaluation data in accordance to the developmental profiles of teachers and participants.

In the course of the CADRA project, we were able to design these features so that they can be tested with learning programmes.

Future areas where we see application for the StoryMatcher include:

- Job portals: Connecting people to work
- Talent management and work culture: Connecting people to organisations
- Community connections and relationships: Connecting people to people

5. Concluding remarks

When designing the project in 2020, we sought to develop a freely available self- assessment version of the StoryMatcher. Since then, we have collected a broad variety of success memories from a broad range of individuals across Europe, and built a scenario set in English, German and French.

We tested the story selections as a way to measure the developmental position of individuals in the 5 orders as modelled by Kegan. Results strongly support our initial hypothesis that the story selections indeed serve as a sufficiently approximate measure of adult development. This is a major breakthrough in the fields of adult development and organisational management, as it will allow for the rapid and cost-effective analysis of many more individuals in limitless applications.

We had planned to integrate the StoryMatcher functionalities in a learning platform, which would support the Samana festival foreseen in 2022. As the festival was cancelled due to COVID-19, no such learning platform was yet developed. We did, however, develop specific requirements and use cases for using the StoryMatcher in a learning platform.

Building on the encouraging results of the CADRA validations, we will further develop the learning application with the next project, the Nurturing Leadership Seeds in Ukraine. This collaborative program with Ukrainian social entrepreneurs will commence December 23, 2023 with the support of ERASMUS+ funding.

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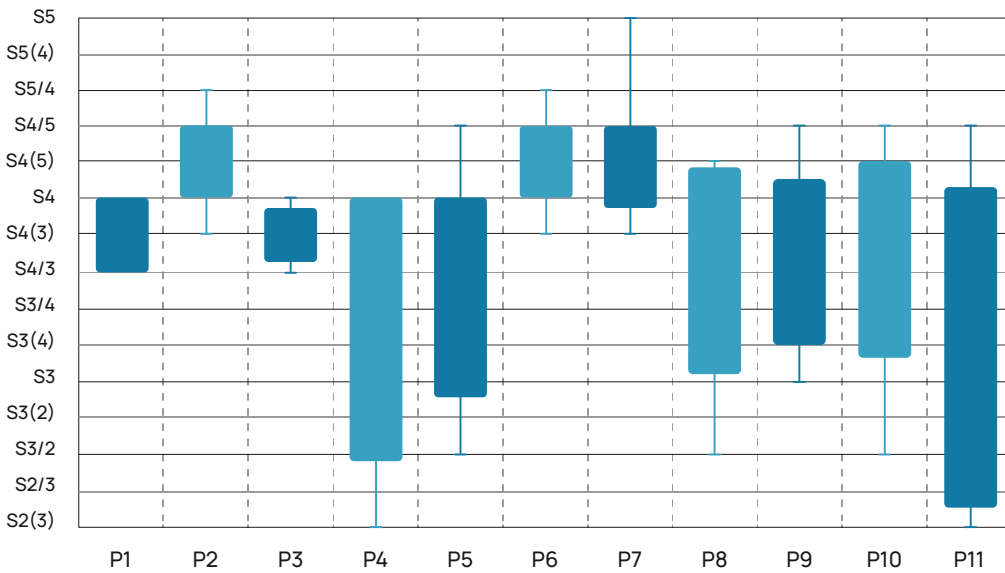
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Appendix: Detailed histograms for case study 2

When comparing the full data sets, one notices that the StoryMatcher tends to include a broader range of stage information than the interview scorers. That is owed to the fact that the scenarios themselves often cover a broader range in the Kegan scale.

As long as the most central mode is used for further analysis or matching, this measurement discrepancy balances out. E.g. participant 11 in the study had just one outlier value at 2/3, which increases the range of that data set, while the center is around 3.

Case Study 2 - Story Matcher scoring - detailed results



Case Study 2 - Interview scoring - detailed results

