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Intellectual Humility: What Shapes Its Expression and Interventions for Its Promotion

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Abstract: Intellectual humility is the belief that one can be intellectually limited and fallible. It is widely found that intellectual humility expression can benefit the learning process and improve education outcomes. Under a metacognitive frame, contemporary theories on Field-specific Ability Belief (FAB) argue that what one believes in the necessary "ingredients" for success decidedly affects how the external and internal factors shape the expression of intellectual humility. The versatile nature of FABs has also proven interventions effective in promoting intellectual humility expression. Recent attempts to help students through forestart programs in embracing a growth mindset have concluded successful. Longitudinal data meta-analyses have also offered empirical support addressing the necessity of refining current education for more voluntary intellectual humility expression. The findings in this paper suggest a very promising field for future studies fostering broad education improvements.

Keywords: Intellectual Humility, Metacognition, Field-specific Ability Belief, Growth Mindset

1. Introduction

Intellectual humility is the owning of one's intellectual limitations [1]. To be human is to hold intellectual fallibility and ignorance. Conscious awareness of such facts benefits not only adequate evaluation of one's capabilities but also continuous growth in learning. It is believed that mastery in various areas can be predicted and cultivated from intellectual humility behaviors [2]. This is especially held true in education. Asking questions in front of a class, expressing confusion, seeking help and support for a specific subject — these all are ways of admitting that the learner is intellectually limited. Voluntarily making such expressions can promote much more active learning than seeking out information alone and can greatly benefit one’s education outcome.

The core mechanism behind intellectual humility expression is no doubt worth special attention. Across different fields in psychology, it is held in consensus that metacognition accounts for the prevalence of intellectual humility [2]. External situations trigger self-appraisal in metacognition, and metacognition will further decide what coping strategy will be selected and what goal should be accomplished. Cognitivists argue that it could be the sudden realization that you are incapable of understanding something that evokes conscious monitoring of cognitive strategies, which brings out fruitful learning enterprises [3]. Intellectual humility stands out as a prominent strategy for inducing successful learning because it not only serves as a balance between intellectual arrogance and diffidence but also a mediator between confirming and opposing opinions [4]. Intellectually humbled

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students engage in more frequent knowledge acquisition, become more flexible in adjusting personal beliefs, and are more likely to adopt a growth mindset [2].

Willingness to make intellectual humility expressions, however, can often be unstable under the effect of contexts and motivation factors. Subjects that emphasize intellectual abilities, such as those of STEM, usually strongly discourage explicit showing of intellectual humility [1]. Stereotypical thinking toward ethnic backgrounds, socioeconomic status, and gender roles can also result in the inhibition of such willful expressions [5]. This study will focus on the analysis of what exactly shapes the usage of this specific learning strategy. Under the model of metacognition and cognitive monitoring proposed by J. H. Flavell, field-specific ability beliefs (FABs) make distinguishable notice as an explanatory method for predicting interindividual and intraindividual performance differences under various contexts. The belief of what is necessary to be successful can be constantly progressed and shifted under metacognition development, which makes it vulnerable to prior limits and misconceptions. FABs can be a major motivation factor in deciding strategies for learning, and interventions are believed to be effective in the reconstitution of FABs toward learning autonomy development. Evidence from longitudinal data analysis has suggested that compared to intellectual abilities, non-intellectual abilities, especially performance self-efficacy, stand out as the most significant predictor of education excellence [6]. Cultivation of growth interest beliefs has also proven plausible in fostering active learning and better education performance [7]. Simply applying distanced thinking can also improve learning progress and increase exhibitions of intellectual humility over a short time [8]. Through a comprehensive analysis of previous works, the intrinsic and extrinsic factors promoting active learning can be better understood, and effective interventions can be designed to encourage expressions of intellectual humility. Accomplishing this goal will not only assist greater student success but also support better education equity.

2. Theoretical Framework

First of all, it is important to clarify the definition of intellectual humility. Intellectual humility makes its distinction from general humility as the latter emphasizes cross-domain recognition of one's shortcomings and incapability, willingness to resign from claiming achievements, and consideration of alternative views regardless of one's own beliefs. Intellectual humility chiefly focuses on the epistemological level, and the very core of its evolution requires an understanding of one's own beliefs and realizations of how these beliefs can be fallible and limited [9]. The nature of intellectual humility makes it turbulent and sensitive to situations and contexts and distinguishes itself from a fixed quality. In general, psychology fields favor a metacognition account for the formation and modification of intellectual humility expression and lean towards viewing intellectual humility as a construct that can be inferred from vast learning behaviors [10].

J. H. Flavell has proposed a fairly explanatory model for analyzing intellectual humility under metacognition logistics. Flavell argued that successful learning is the result of sufficient metacognitive monitoring and cognitive execution, and he categorized four segments of this enterprise: metacognitive knowledge, metacognitive experience, task, and strategy [3]. Metacognitive knowledge is about the understanding of interpersonal and intrapersonal variables, goals appropriate for overcoming appraisal raised during learning enterprises, and effective actions that can potentially bring desirable learning outcomes. Holding such knowledge makes it possible to elicit the metacognitive experience of epistemological insufficiency, which can often be the tension of not understanding something or realization of needing improvements, and further initiate the monitoring of metacognitive task selection and strategy making in cognitive execution. The monitoring of the latter two is often emphasized as a mindset in current studies and is believed to be constantly shaped by various factors. In the notion of this, field-specific ability beliefs are a promising account for both

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extrinsic and intrinsic factor effects on individuals and are believed to be crucial in embracing a growth mindset [5].

FABs are beliefs about the necessary "ingredients" to being successful, and in academic fields, these ability beliefs are often strongly brilliance-oriented [11]. Evidence supporting the FAB's account is especially exemplified in the widely observed gender segregation in academia. Through longitudinal data research on women versus men entering and exiting STEM fields, Hannak et al. have identified FABs as a predictor of fewer females entering the fields and more females exiting the fields. The cultural emphasis on women's gender role of being altruistic and lenient conflicts with the common belief of STEM fields being highly competitive and egocentric. The wide belief of high intellectual aptitude, or "brilliance," in the excellence of STEM can be more frequently connected to men instead of women. Accordingly, it is found through the research that women are more likely to adapt to fields that emphasize effort and non-intellectual characteristics and show higher rates of withdrawal from areas that emphasize otherwise. It is inducible to say that FABs are vulnerable to cultural and contextual prejudice and bias, and the self-constraining beliefs about success further limited metacognition abilities for goal setting and strategy execution. In fact, it is found that context emphasis on intellectual abilities often induces FABs that elicit challenge appraisal in metacognition and can greatly hinder intellectual humility expression in avoiding the risk of failing because non-intellectual behaviors are believed to conflict with the necessary components of success [1].

Upon this analysis, FABs appeal to be strongly correlated with intellectual humility expressions. Its cultural and contextually sensitive nature makes it possible to reshape towards a growth belief, and interventions can be effective in adjusting FABs and promoting intellectual humility.

3. Shaping Expressions of Intellectual Humility

Contextual and cultural influences can immensely shift FABs towards certain qualities and shape intellectual humility expressions extrinsically. In the work of Porter and Cimpian [1], self-evaluations and reports of perceived math and higher education institutions were collected from participants of high schoolers, undergraduates, and young adults. Three coherent studies were done assessing what subject settings are identified as difficult and how comfortable the participants are in expressing intellectual humility under the settings; whether the willingness to express intellectual humility is correlated to FABs on extents of brilliance needed; whether the correlations between the FABs and intellectual humility expressions are causal, especially in speaking of growth and fixed mindsets. It was concluded that all three groups of participants consider math and selective institutions in favor of innate talent, and the emphasis on intellectual ability can strongly stifle students' expression of intellectual humility because of the belief that such behavior can put them at risk of being viewed as lacking core competence. It is also worth noting that the results drew implications of the masculinity-contest culture, in which students often perceive "a stronger 'dog eat dog,' zero-sum" competition in learning environments because the overt stressing of intellect prevents students from adopting a growth mindset that proposes "brilliance" as not being a quality but a growing capability. From this point of view, female students are at greater risk of underrepresentation in academic fields because “brilliance” is more commonly related to males, and the idea of competition often contradicts female gender characteristics.

The FABs attribution can also find support in the work of O'Keefe et al. [7], which argues that a growth mindset is cultivable and has proven effective in increasing students' active learning and overall academic achievement. The authors of this work completed a series of controlled studies on newly admitted college students in Singapore, who are considered to have very high aptitudes in natural science subjects such as math and physics. Despite their excellence in prior academic life, these students are not necessarily self-identified as interested learners in the fields of STEM subjects. It is, however, required for these students in their first year of college to intensely study these subjects

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even though they can be viewed as challenging and dull, and this is also elaborated in the future the importance of being conversant in the subjects of STEM. The authors, therefore, suspect that interest in learning may stand out as a more prominent factor than intellectual ability in affecting students' future academic performance. In the hope of finding the effectiveness of intervention promoting a growth theory of interest, the authors conducted pre-semester modules in two separate institutions for either liberal arts or general undergraduates. During the modules, students were randomly assigned to either receive materials of growth theory of interest exercise or materials of active control exercise, which merely address the importance of study skills. The impacts of the modules are accessed through students' self-reflections on their views of math and science coursework and their first-year GPA. It was found that compared to students who only received materials for study skills, students who were induced to growth-interest theory exhibited more voluntary learning behaviors and became less uncomfortable expressing intellectual humility. The pressure of peer competition in STEM subjects is also perceived as reducible because it is no longer innate quality-focused. It is confirmed by the authors that interventions are effective in boosting a stronger growth theory of interest in students, increasing students' overall interest in challenging subjects, and ultimately achieving higher academic performance.

The argument of O'Keefe et al. can also find empirical support from previous longitudinal data analysis. Richardson et al. [6] analyzed the correlation between both intellective and non-intellective factors and students' quantified academic performance through a 13-year-long data collection. In answering what antecedents played the most significant role in predicting undergraduate students' performance, the authors have identified that items evaluating prior cognitive capacities, such as SAT, ACT, and A-level scores, present a medium correlation to future undergraduate GPA. Non-intellectual items, such as academic self-efficacy, grade goal, and effort regulation, are also found to have a medium correlation with undergraduate GPA. Performance self-efficacy was found to hold the greatest correlation to college GPA above all items mentioned. Performance self-efficacy pertains to the combination of distal learning goals and proximal performance goals, and students aiming for this combination achieved higher GPAs than those who set only distal goals or those who were cramming up for examination and presentation. Students who have such goal settings are also found to be more versatile in adjusting learning strategies and are more likely to believe intellectual humility is an escalator to educational success. It was, therefore, suggested by the authors that goal-setting interventions can be effective in eliciting better academic performance. Students should be educated that education is a process that values more on its progress rather than its quantified assessment. The role of teachers is also important for increasing and maintaining students' self-efficacy. Lowering students' anxiety about coursework, making reasonable workloads and examinations, emphasizing mastery experiences, and providing feedback on successful performance can all be crucial in fulfilling this purpose.

Finally, research studies on human wisdom may also shed some light on the intrinsic factors that shape intellectual humility expressions. According to Grossmann [12], wisdom is the ability to "discern inner qualities and relationships." The characteristics of wisdom involve recognition of uncertainties and changes, consideration and integration of different perspectives, and, notably, intellectual humility. Through research on how people learn from exemplars, Grossmann believes that emphasizing the contexts of personal motivation and socio-psychological backgrounds can cultivate wisdom when one is in challenging situations and is needed to make difficult decisions. This argument is involved in his previous study, which prompted the participants' distanced thinking. Through two situational questions on career prospects of unemployment during an economic recession and anticipated changes associated with one's candidate loss in the presidential election, Kross and Grossmann [8] have found that prompting distance from the self helps promote wisdom.

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Research subjects were more likely to exhibit intellectual humility, undergo active learning, and become more open to adapting to different perspectives after distanced thinking is induced.

4. Promoting Intellectual Humility

Applicable interventions should generally focus on two levels: cultivating growing motivations for students, especially when they are in challenging situations, and educating instructors on proper methods for communicating and providing feedback. As discussed in the section above, students' FABs can be very versatile under the influences of external factors, and a growth mindset that encourages intellectual humility expressions can be fostered by specific ways of addressing the subjects and their relationship to personal interest and non-intellectual abilities. As what has been found in the work of Porter and Cimpian [1], STEM courses are commonly considered difficult and competitive to students from a broad range, but the aspects of its competition usually stress more the intellectual qualities and can often elicit passive learning and fading motivations in students who believe themselves to be out of the "talented" category. From the work of Yeager & Dweck [13], it is found that by promoting the idea that intelligence and talent are malleable, students are more likely to adopt a growth mindset, which allows them to cope with current "brilliance" oriented challenges in academia. The authors have taught high school students through a program named "Brainology" on brain plasticity and intellect growth, which elaborately revealed to the students that talents are malleable and abilities can progressively increase through effort. By using neuroplasticity findings to challenge the common belief in innate ability, the authors have successfully broken the contextual framing of intellects in STEM for the students and significantly increased the students' interest and curiosity in learning. Like what was found in the experiment of O'Keefe et al. [7], when students were taught that they all have the potential to grow intellectually and become interested in STEM, they showed much better resilience in challenging courses. More importantly, Yeager Dweck has encouraged students to be curious in learning, and when students are curious, they are more likely to ask questions, seek feedback, and engage deeply with the material—all behaviors that elicit intellectual humility. Pre-semester teaching modules or programs like this, therefore, can certainly be beneficial to the topic.

Educators should also make an equal effort to refine their instructing methodologies. Just as stated by Yeager & Dweck, language that emphasizes "smartness" can inevitably diminish students' desire for active learning if they find this trait not belonging to themselves. Meyer et al. [14] have also argued the pivotal importance of educators in mediating maladaptive beliefs and pointed out that growth belief can be promoted by minimizing the discussion of innate talent regardless of the domains it affiliates, highlighting the role of effort and persistence, providing positive feedbacks on achievements promptly. By explicitly giving the message of paramount dedication, better overall student achievements and longitudinal beneficial effects can be found [15]. It is vitally important that, however, dedication emphasizing doesn't distort into comforting. A phrase like "it's ok, not everyone is that smart" is considered a mere comfort on individual performance differences and is still endorsing a fixed quality mindset. It can greatly discourage students from intellectual humility, regardless of how they identify themselves, as they try to avoid further humiliation or potential disappointment from others [16]. Comforts like this can allegedly exacerbate gender segregation in STEM fields because females are more commonly believed to be "not as good" at math and science, and even if they are making prominent progress in these fields, they would often be under higher pressure than males in being "perfect" and maintaining their beliefs about personal abilities [17] [18]. It is, in this sense, equally necessary for institutions to create sessions addressing the proper methods educators should conduct during their interactions with students.

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5. Discussion

Intellectual humility expressions can be beneficial to overall student learning, and by using a cognitive approach that also considers the contextual and environmental factors, the mechanism of promoting intellectual humility is better understood. Following the concept of metacognition, this study proposes FAB as a further advanced method in analyzing the motivation for intellectual humility and has found empirical support from recent research on assisting more significant student growth. This study found the messaging of a growth mindset can decidedly affect student self-recognition, learning strategy, and overall resilience. Educators should apply methods of teaching that avoid any brilliance-oriented message, and institutions should consider additional programs in growing interest and potential for nurturing students with a growth mindset. This study has indicated a pathway for future investigations on better education.

6. Limitations

A cognitivist perspective in defining intellectual humility needs to be more comprehensive under the views of psychologists in other fields as they focus more on the social contextual factors and generally favor a constructivist account that stretches the range of what can shape intellectual humility expression. It is believed by these scholars that cognitive, behavioral, and interpersonal factors shape intellectual humility altogether, and current measurements on the topic expression can be rather limited because it is often done through questionnaires and self-reports under laboratory manipulations [19]. Nevertheless, taking the metacognitive account into analyzing this topic is agreed to be irreplaceable as it makes empirical assessments testable. Including a cognitivist frame also prevents overlapping labels in measuring the components and outcomes of intellectual humility, as many of them are consensually attributed to metacognition [20]. It is, however, undeniable that an overt emphasis on metacognition account can hinder the virtue and possibility of finding yet unclear attributions that can promote intellectual humbleness. It is suggested in this sense to evaluate the topic under a metacognitive core that is supplemented with different perspectives.

7. Conclusion

Intellectual humility is coherently connected to the formation of a growing mindset, and voluntary expression of it is believed to be beneficial in various domains. This work has focused on finding the shaping factors of intellectual humility under a metacognitive frame, combined with elaborative evaluations of social and contextual factors. The contemporary works on FABs offered an efficient interpretation of how external and internal factors co-influenced each other and lightened a pathway into refining current education. Empirical works on longitudinal data analysis and refined experiments have also proven interventions plausible in helping students grow motivation, persistence, resilience, and excellence. It is certainly worth future studies on the topic of improving education quality for vast student groups and achieving greater education equity for students of all genders and backgrounds.

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