Individual Development Plans (IDPs): An Underutilized Advising Tool in the Geosciences

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INDIVIDUAL DEVELOPMENT PLANS

Effective mentorship plays an important role in student retention and success. However, many faculty lack formal training in mentoring and may not be aware of some available tools, such as individual development plans (IDPs). IDPs have received little attention in the geosciences despite their growing popularity in other science fields.

IDPs are designed to help research trainees set academic goals, develop professional skills, explore career opportunities, and conduct long-term career planning. Originally developed to help prepare students for a tightening academic job market (FASEB, 2002), IDPs are also a useful advising tool, highly valued by mentors for facilitating communication and identifying areas for improvement (e.g., Hobin et al., 2014). IDPs have been gaining popularity at the graduate and postdoctoral level and were recently featured by the National Academies of Sciences, Engineering, and Medicine (NASEM) in their new report on effective mentoring (NASEM, 2019).

Developing an IDP is an iterative process that includes self-assessment and action planning components. IDPs leverage effective practices in goal setting (e.g., Gollwitzer, 1999) with a focus on skills development rather than specific performance metrics. Ideally, the mentee obtains guidance and feedback on their IDP from their advisor and/or others.

Some university departments and even individual lab groups (e.g., Vincent et al., 2015) have developed their own forms to guide this process. For those interested in more extensive career exploration tools, there are also several free online IDP platforms, such as myIDP (http://myidp.sciencecareers.org/) for STEM, and ImaginePhD (https://www.imaginephd.com) for the humanities and social sciences.

While data on IDP effectiveness are sparse and generally based on small sample sets, initial studies are promising (e.g., Tsai et al., 2018). A 2014 survey of postdocs (Hobin at al., 2014) found relatively low usage rates but high perceived value among those who had used IDPs (71% of postdocs, 90% of mentors).

THE 'IKE WAI PROJECT

Since 2017, we have been piloting a small IDP program as part of 'Ike Wai, a multidisciplinary research project focused on water resources and sustainability at the University of Hawai'i. Funded by the National Science Foundation's (NSF) Established Program to Stimulate Competitive Research, 'Ike Wai (Hawaiian for *water knowledge*) includes a capacity-building initiative to develop a diverse local workforce in hydrology and related fields. IDPs form part of a larger professional development program that includes holistic mentoring, research training, and broad skills development.

'Ike Wai graduate students and postdocs develop their IDP with guidance from both their research advisor and an external professional development (PD) mentor. The PD mentor, a faculty/staff member selected by the trainee from outside their discipline, serves as an additional resource and perspective. All parties work together to ensure the action plan is both useful and realistic. We emphasize that completing an IDP is a trainee-driven process—they are ultimately responsible for defining and communicating their future goals and aspirations and soliciting feedback on their plan.

Survey results indicate students particularly value their interactions with their PD mentor, and a majority agreed or strongly agreed that completing the IDP helped them think about their long-term career goals (Fig. 1). In spite of the time required to complete and update their IDP on a regular basis, only 16% said they would not recommend an IDP to other students or postdocs, consistent with what we hear as facilitators—most find the process useful and are ultimately glad to have done it. Similarly, 81% of 'Ike Wai advisors and PD mentors agreed they would recommend IDPs, with 90% agreeing that completing an IDP helped students think about their academic and long-term career goals (GSA Supplemental Data Fig. S1[1]).

While possibly coincidental rather than causal, we note that the trainees in our IDP program have shown exceptional leadership, taking on responsibilities beyond that of typical graduate students. Examples include convening conference sessions and workshops, requesting representation on the project's leadership committee, mentoring undergraduates, and taking a leading role in drafting project reports, planning fieldwork, and managing lab budgets.

Alumni report that they value, and continue to use, the goal-setting skills they learned from IDPs. As recent graduate Julie U'ilani Au wrote, "By setting personal and professional goals for myself, I have been able to gain a clear vision of what I want to do with my time and my career. Whenever I feel overwhelmed or confused, I think back to the IDP structure and make goals that I can hold myself accountable to."

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[1]Supplemental Material: Additional program information and implementation details, advisor/mentor survey results, and a copy of the basic IDP template used in the 'Ike Wai project. Please go to https://doi.org/10.1130/GSAT.S.12130890 to access the supplemental material, and contact editing@geosociety.org with any questions.

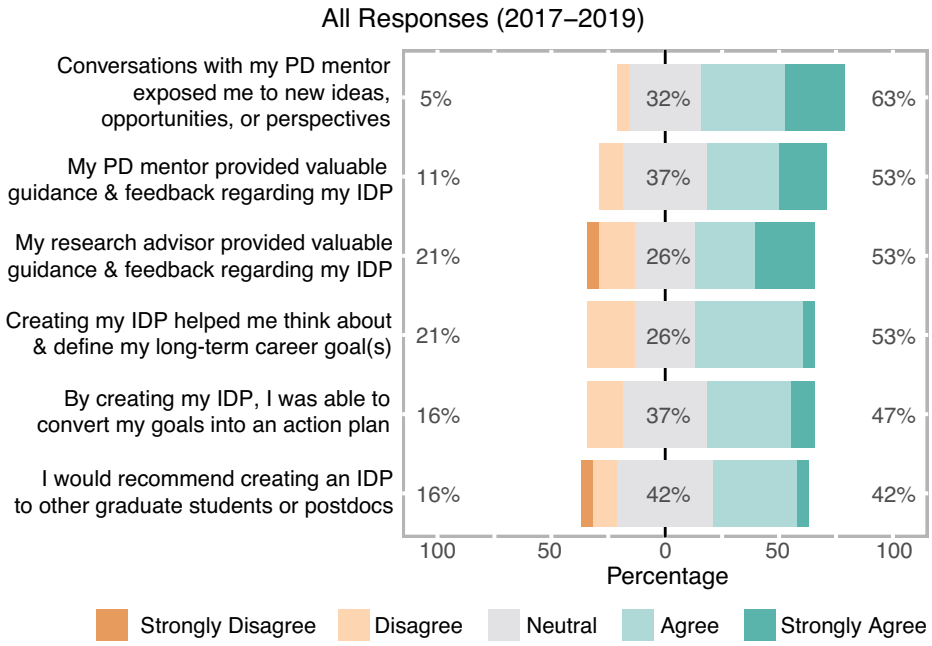

Figure 1. Aggregated results from our annual, anonymous survey of graduate students (2017–2019) (*n* = 21). Percentages shown correspond to the total responses for disagree or strongly disagree (left), neutral (center), and agree or strongly agree (right). IDP—individual development plans; PD—professional development mentor.

IMPLEMENTATION

Based on our experiences with this ongoing pilot program, we outline a few key considerations for those interested in implementing their own IDP program.

A Flexible Template

We created a simple custom form suited to the ʻIke Wai project that includes six core competencies: Research, Teaching and Mentoring, Leadership, Communication, Career Development, and Place and Culture (Supplemental Data Fig. S3). The last category was added to formalize the importance and relevance of cultural knowledge and skills. The project has an unusually diverse student cohort, including a high proportion of Native Hawaiians, women, and others from historically underrepresented groups. Moreover, a significant project component entails engaging with a diverse community of landowners and other stakeholders, which requires an additional set of knowledge and skills that were not well captured by most standard IDP templates. Although we provide forms, we also give trainees the option of using alternative formats as long as they capture the critical elements of an effective action plan: having specific, actionable milestones with clearly defined outputs and a realistic timeline. While many students stick to the provided template, some have opted to use an online calendar or custom color-coded timelines. We also provide links to online IDP platforms with extensive career exploration tools as additional resources (e.g., myIDP).

Expanded Mentoring Network

According to our survey results, our trainees highly value PD mentors. The additional time burden on the mentor is minimal (most report spending ~1 hr or less per term; Supplemental Data Fig. S2), and while students could cultivate such relationships themselves, providing a formal match removes some of the psycho-logical barriers to asking for help. This second mentor may play a particularly important role if the advisor-advisee relationship is strained, or their PD goals are poorly aligned with their research project. We also note this role has been particularly useful for underrepresented students seeking the guidance of someone from a similar background and shared cultural values. Particularly in the geosciences, one of the least diverse STEM fields (NSF, 2019), connecting students with faculty members outside their immediate discipline is one option for expanding and diversifying their support network.

Advisor Buy-In

Some of our experiences and feedback point to the importance of advisor buy-in and engagement, consistent with other studies that find advisees are more likely to value the IDP process if their advisor also does (e.g., Hobin et al., 2014). In other words, this process is not a fix for a disengaged advisor or one who is dismissive of non-academic careers. However, we note the potential power of the IDP process to open a dialogue on future career plans and perhaps dispel incorrect assumptions advisors may have about an advisee's goals and aspirations. Everyone benefits from starting this conversation early and helping trainees build the skills they will need for their future, whatever their chosen path.

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