

Conceptualizing Research Relationships to Enhance Broader Impacts at the University of New Mexico

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Abstract

This paper focuses on enhancing researchers' ability to articulate and achieve societal impacts in their work using the ARIS Broad Impact (BI) Toolkit as a jumping off point. The authors conducted a survey of UNM researchers to understand their approach to societal impact and relationship-building in research projects. The key findings suggest that 1) researchers across disciplines and funding sources value societal impacts in their work; 2) most UNM researchers engage in collaborative relationships as part of their efforts to achieve broader societal impacts; and 3) while researchers feel confident in conceptualizing and carrying out activities related to broader societal impacts, they are less confident in writing BI statements for NSF proposals. Based on these findings, the authors recommend that research development professionals 1) emphasize the importance of finding meaning in research through its broader social impacts; 2) develop tools to support more intentional relationship-building in research projects; and 3) provide resources to help researchers translate their ideas into effective BI statements for proposals. The paper concludes by highlighting areas for further research, including student engagement, mentorship, and institutional questions about BI project development and evaluation. The authors argue that addressing these areas is crucial for enhancing the societal value and effectiveness of scholarly work, ultimately driving significant positive change through research.

The University of New Mexico (UNM) is a research-intensive, Hispanic-serving institution (HSI), which receives roughly 40–50 new National Science Foundations (NSF) awards per year; NSF is only one of many funders in our research funding portfolio. Our motivation to join the second Center for Advancing Research Impacts in Society (ARIS) cohort was to explore the ARIS Broader Impacts (BI) Toolkit's application and utility to help researchers, in all fields, clarify and strengthen their research impacts and their work's benefits to society. Although the BI Toolkit currently focuses only on the NSF's requirements for broader impacts, we approached this work from the perspective of research development professionals whose role is to broadly support societally relevant research at our institution. As such, we turned to the BI Toolkit as a jumping-off point to think about what that support could look like. We posit that helping researchers foster more intentionality when building these types of relationships would not only allow them to meet

NSF's BI goals, but also develop more socially impactful projects in general.

The BI Toolkit asks researchers to think about the target audience for their BI projects and the partners they would need to engage to reach that audience. This is effective for helping researchers describe their BI project in clear terms—*we partnered with X organization to reach Y group to achieve Z aim*—or for helping reviewers rate a proposal; however, we wondered what more could be done to facilitate thinking about the formation of these associations as interpersonal relationships and to productively grapple with social dynamics *within* research teams. We believe there is an opportunity to guide researchers to create more ethical, meaningful, and impactful research by facilitating more critical/intentional thought around 1) how to frame the social impact of their work most appropriately, even beyond NSF proposals; 2) how to structure relationships to achieve and measure meaningful societal impact; and 3) how to align their work with the

This article is included in a special issue focused on the Implementation and Evaluation of the ARIS Broader Impacts Toolkit project, which is designed to advance the understanding of mechanisms and supports needed to develop effective Broader Impacts (BI) statements. The full issue can be found at www.jces.ua.edu/arisbitoolkit

impact they hope to achieve. While in its current form, the ARIS BI Toolkit touches on the idea of engagement with either “partners” or “audiences,” we determined that our researchers would benefit from more nuanced guidance to support high-quality relationship-building among researchers and intended beneficiaries of research—both its processes and outcomes.

This paper starts with a discussion of our institutional context and positionality toward the ARIS BI Toolkit. As part of thinking through research relationships, we conducted a survey of research-active faculty, students, and staff at the University of New Mexico. We asked about the importance of the societal impacts of their research to them and their engagement with others as part of that work. After sharing our survey methods and findings, we connect what we found at UNM with broader literature around research relationships. Finally, we summarize our findings, share next steps we are considering, and discuss opportunities for future research.

University of New Mexico Case Study

Context

In line with Fecher and Hebing’s work (2021), we sought to better understand how researchers at our home institution approach societal impact. To gauge the need for assistance forming, conceptualizing, and building intentional relationships as part of creating broader societal impacts, we gathered anonymous survey responses from researchers at UNM. UNM is a public research intensive (Carnegie Designated R1) institution with \$331,164,000 in R&D expenditures in FY22 (National Center for Science and Engineering Statistics, 2022). It is also a Carnegie-classified Community Engagement Campus (Carnegie Classification of Institutions of Higher Education, n.d.), and an HSI, as defined by the U.S. Department of Education. Our office, the Faculty Research Development Office, is under the auspices of the Office of the Vice President for Research, giving us access to researchers across the university as well as centralized data about funding applications submitted through UNM’s multiple campuses. We invited anyone—staff, student, or faculty—who had served as the lead applicant/principal investigator (PI) on an application for external funding due between January 1, 2022, and June 30, 2023, at the UNM main campus or any of UNM’s four branch campuses to participate. The study was reviewed and approved under UNM IRB protocol #2307072638. This generated

a respondent pool of 442 applicants. Because we are interested in the social impact of research in general, we surveyed researchers who applied to any external funder, including but not limited to the NSF. The NSF was the most common funder among our survey respondents, but that still only represented about a quarter (24%) of all the applications submitted by respondents.

Methods

In this vein, the survey asked about activities, goals, and aims meant to “improve society” or create a “broader societal impact” rather than using the NSF term “Broader Impacts” which might be either unclear to those unfamiliar with the NSF review criterion or perceived as referring only to NSF projects. We included the following non-exhaustive series of examples of broader societal impacts in the survey as well:

Increasing diverse representation or equitable treatment within a field of academia or at UNM more broadly; improving the well-being of individuals in society; increasing partnerships between academia, businesses, nonprofits, and/or community groups to extend the impact of your project and/or improve the lives of people in general or members of particular social groups.

After asking the applicants to confirm that they had submitted at least one proposal for external funding during the 18-month period of our study, the survey asked a series of 30 questions that can be grouped into six short sets: 1) General questions about their proposal submissions. 2) Questions about the goals, aims, or activities included in the proposals that were explicitly focused on improving society. 3) Questions about the applicants’ beliefs about the importance of and their ability to describe and achieve societal impacts. 4) Questions about the types of relationships that undergird the proposal. 5) Feedback on the ways in which the researchers would like to receive training. 6) Their knowledge about and reflections on the ARIS BI Toolkit. Most of the survey was made up of multiple choice, multiple select, or Likert questions. We only required written responses when researchers selected “other” from a list of options; indicated that they needed to modify their proposed BI activities; outlined how they engaged with various research participants, partners, or audiences during the development of their proposals and, if applicable,

the implementation phase of their projects; and shared any concluding thoughts with us.

We left the set of questions about relationships purposefully vague to see how researchers themselves would characterize the relationships. One yes-or-no question asked if they tend to collaborate with partners as part of working towards a broader societal impact. After that initial prompting, however, we did not use either the terms “partner” or “audience” again. Instead, the other two questions in this set asked them to select among a list of “groups” they “included in their proposal(s)”: the general public, government/policy makers, graduate students, identity-based affinity groups, industry, K-12 students, life-long learners, nonprofits, non-university educators, other universities, undergraduates, student service offices, and other (with a write-in option). They were then asked to describe how they engaged with this/these group(s) during the development of their proposal(s) and, if applicable, the implementation phase of their project(s).

There are researchers at UNM who are doing work with broad societal impacts without external funding, but we chose to focus on those who had recently applied for funding for three reasons: 1) Funding applications are a concrete space where researchers are required to articulate their practices and aims, inviting more introspection and clarity about the desired impact of their work. 2) The ARIS BI Toolkit focuses on building skills to respond to the BI review criterion for NSF funding proposals. We wanted to stay within the same general area—funding proposals—while expanding the field of inquiry to proposals for other funders. 3) Our office’s purview includes supporting researchers with funding applications, so we have access to this data and will be able to affect change in this sphere in response to the lessons learned from the study.

Survey Findings

The survey garnered 117 complete responses (a response rate of 26%). We did not ask respondents to identify their role at the university, so we cannot be certain that this is a representative sample of the UNM research population. We are not considering the answers received conclusive or statistically significant. Instead, the survey responses helped us characterize the issues we see in our work as research development professionals on campus. The following takeaways, in turn, helped us clarify the interventions we could take to better support relationship-building in the research context. After collaboratively reviewing

and discussing the survey responses, three key takeaways emerged that helped us clarify the interventions we could take.

1. Societal impacts matter to researchers across disciplines, project types, and funding sources.

Survey respondents applied to sponsors ranging from the Department of Education to the Department of Energy, from the National Endowment for the Humanities to the National Science Foundation, the National Aeronautics and Space Administration, private foundations, and the National Endowment for the Arts, among others. Of the 117 respondents, a majority—92 people, or 79%—responded “yes” to the question asking if their funding proposal(s) included “any explicitly stated goals, aims, or activities that were focused on improving society.” Likewise, 113 survey takers responded to the prompt “Please use the 1 to 5 scale to rate your level of agreement with the following statement: ‘It is important for my work to have a broader societal impact.’” Of those 113, 70 selected “strongly agree” and 30 selected “somewhat agree,” accounting for 88.5% of responses when combined. This positive majority includes applicants to sponsors like the NSF, which explicitly rate proposals on their broader social impacts, and those funders for whom social impacts are either not important or are assumed to be one among other research outcomes.

This finding underlines the utility of a tool for researchers that would emphasize how to achieve societal impact more broadly, not just for developing NSF BI statements. This would be especially valuable at universities like UNM that prioritize place-based, team-based, and community-engaged work. While the NSF provides an excellent starting point for thinking about how to frame BI—especially since broader impacts are part of their merit review criteria for proposals—a resource structured to inform researchers about shaping the societal benefits of their work more generally has the potential to serve more researchers and more diverse researchers, including those from institutions that are less well-represented in NSF awards.

2. Most UNM researchers are engaging in research relationships as part of their work to have a broader societal impact.

Some of this collaboration or outreach is centered specifically on BI work, and some is not. We left the definition of these relationships intentionally vague to allow the survey respondents

to define them. 91% said that as part of working towards a broader societal impact, they tend to collaborate. Among this group, respondents selected every type of collaborator we listed, with graduate students being the group with which respondents most frequently collaborated, followed by other universities, undergraduates, and a range of others (see Figure 1). 5.6% of respondents wrote an answer in the “other” category, including specific museums in Albuquerque, national labs, local Indigenous Tribal communities, and postdocs, among others.

When asked *how* they engaged with these groups during the development, and, when applicable, the implementation of their projects, respondents wrote in 79 individual answers, categorized in Table 1 (some answers fit into more than one category).

The categories vary in kind and are not mutually exclusive, but meetings, general collaboration on the project, and work with students at UNM top the list. Some of those who said they built on prior relationships to find collaborators described how they worked with those colleagues—in frequent meetings—and what they worked on—student advancement—and some did not. While not conclusive or statistically significant, these data paint a picture of a research population who are thinking about their collaborations in terms of the day-to-day relationships that undergird their

research and its societal impact more than they are about outreach and audiences. What this indicates is that community engagement and outreach are already happening, yet the ways people perceive things like community, collaboration, and engagement vary greatly. This aligns with other research showing that people who do work focused on social change do not often receive appropriate training, support, or recognition for such work (Kelly & Given, 2024).

3. Researchers at UNM generally feel confident about their ability to do work that achieves a broader societal impact, but those who applied to NSF felt less confident about writing the BI section of an NSF proposal.

73.5% of respondents said they strongly agreed or somewhat agreed (4 and 5 out of 5) with the statement, “I am confident in my ability to conceptualize and carry out activities related to broader societal impacts.” We did not specifically ask about their level of confidence forming the relationships that bolster this work, so while we think it is safe to presume that respondents feel confident about the relationships, we do not know with certainty. These responses were about evenly split between 4s and 5s: 39% selected “strongly agree,” which is a 5, and 34.5% selected “somewhat agree,” which is a 4. Respondents who had applied to NSF felt less confident in their ability to write

Figure 1. Groups Included In Proposals Submitted by Survey Respondents Between January 1, 2022, and June 30, 2023

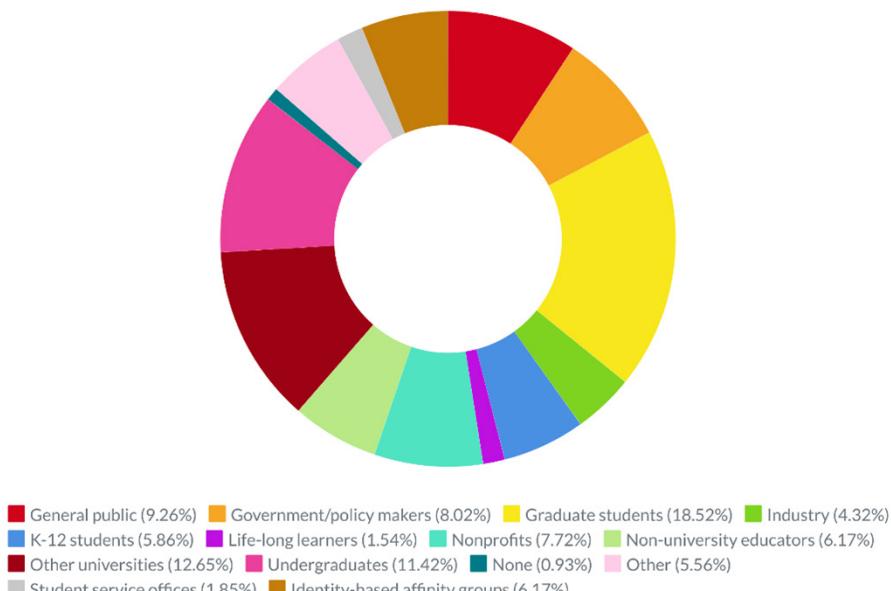


Table 1. Modes of Engagement with Collaborators

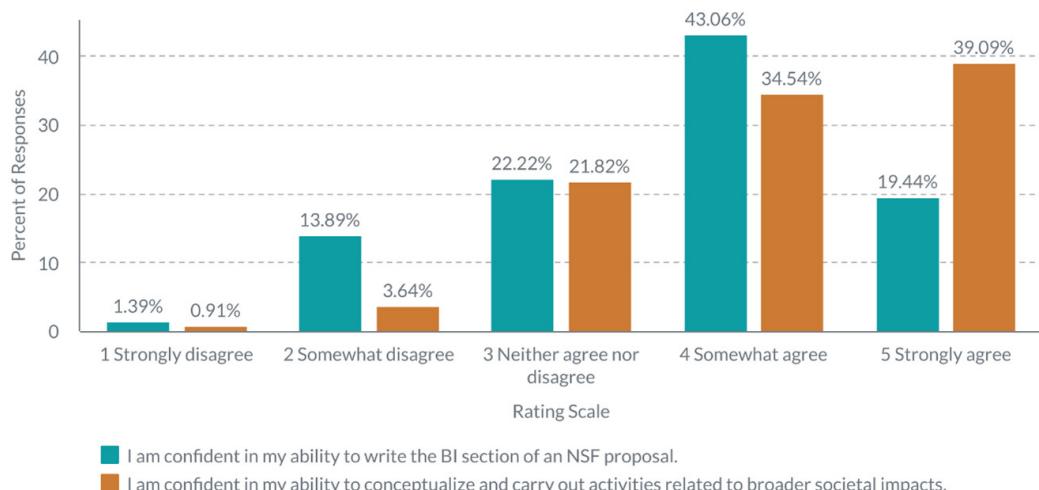
Mode of Engagement	No. of Responses (Descending)
Meetings	27
Collaboration on the project	26
Student development/training	18
Workshops for populations outside UNM	10
Co-writing proposals	8
Building on prior relationships	7
Sharing information through popular media or museums	6
Research aims have an inherent broader impact	6
Requesting letters of support	5
Undefined outreach	4
Monitoring	1
Surveys	1
Seeking mentors	1
Listening sessions	1
Reading publications about target audiences	1

the BI statement for their NSF proposal. (Note that this was a smaller pool of respondents because those who had not applied to NSF were able to select “NA,” see Figure 2.)

A similar proportion of respondents (62%) either strongly agreed or somewhat agreed with the statement, “I am confident in my ability to write the Broader Impacts section of an NSF proposal,” but the split between 5s and 4s was reversed and much larger: only 19% strongly agreed while the

remaining 43% somewhat agreed. Likewise, only 4.5% of respondents were *not* confident in their ability to conceptualize and carry out BI activities compared to 15% of respondents who felt strongly or somewhat strongly that they were *not* confident in their ability to write a BI statement.

The mismatch between respondents’ confidence in their ability to shape broader impacts and draft BI statements can be interpreted a number of ways: it could reflect that researchers

Figure 2. Respondents’ Relative Confidence Writing an NSF BI Statement and Carrying Out Activities Related to Broader Societal Impacts

haven't actually thought through their BI plans as thoroughly as they think they have, and this lack of detail only becomes apparent to them when they put pen to paper; it could also indicate a lack of certainty about how to frame this work and how much weight to give it in the limited space allowed in proposal narratives. We discuss our responses to these possibilities in the following section.

Discussion and BI Programming Recommendations

Based on our survey findings, we have identified concrete next steps to better support researchers at UNM as they work towards achieving broader societal impacts through their work. We start by addressing the three main areas identified in the survey: the importance of societal impacts to researchers, the centrality of relationships, and the misalignment between researchers' confidence conceptualizing their plans and goals for broader social impacts and their ability to convey them in their grant proposals. We hope our programmatic first steps can serve as starting points for research development professionals at other similar institutions.

Importance of Societal Impacts

The societal impacts of research are usually framed in terms of outreach—which group of people is bettered by the work—but there is strong evidence in business and psychology literature that impact is also fundamental for researchers' sense of the meaningfulness of their work and their own sense of purpose. For example, Martela and Pessi (2018) argue that the significance of one's work is comprised of a combination of its broader purpose and whether it contributes to self-realization. Similarly, Bailey and Madden write that meaningfulness arises when “individuals perceive their work invokes the greater good in terms of societal or economic benefits” or “in the service of a ‘higher power’ whether in a spiritual or religious sense, or within a non-theistic, humanist paradigm” (2017, p. 3). Our survey results reflect the centrality of broader social impacts for driving and feeding researchers' commitment to their work.

Even before conducting this study, our office focused on supporting researchers holistically. Since our survey, however, we have further emphasized the importance of finding meaning in one's research, often through its broader social impacts. This is especially true in FRESSH (Fostering Research Expansion in the Social

Sciences and Humanities), our annual cohort program that brings together researchers in the social sciences, humanities, and arts. FRESSH is in its third year, and although each session centers on a particular research skill or process, we began the year with a research strategic planning activity that asked each person to define their values, enumerate their strengths, and articulate the impact they want to have on their field, students, university, city, state, and world. We will return to this framing throughout the year, asking the researchers to use these priorities as the benchmark against which they measure the success of their research and determine the direction of their future work.

Research Relationships

No matter the intended broader impacts, we posit that relationship-building is a critical component for designing a program or research project with societal benefits in mind. This is a grounding principle in the field of community-engaged research, which often focuses on defining and structuring the relationship between university and specific community participants in a project (Stewart & Alrutz, 2012). We are concerned with meaningfully engaging both the collaborative project team *and* the intended target audiences, or beneficiaries, of the project. These groups are not always mutually exclusive; a target audience can be engaged as a partner/collaborator on a project. When PIs are looking to build a social impact program into their research, they must consider who their target audience is, how they will establish an authentic and consistent connection, and how the target audience will participate in and support the research approach (Forbes Business Council, 2022). As our survey findings demonstrate, UNM researchers are already engaged in many types of research relationships. Hence, an assumption behind our research development work is that building these relationships more intentionally will strengthen programs and projects that aim to create societal impact.

To support greater intentionality in nurturing research relationships, we have begun developing tools that allow UNM researchers to think through forming the relationships that enable community engagement, academic partnerships, and collaborations within and among institutions of higher education. Survey respondents indicated that one-page guides are a preferred method for learning new information, so we are developing one-pagers that include reflection questions for investigators working with different groups like,

“What is your mode of engagement with this person/group? Is information-sharing unidirectional or bidirectional? How do you expect your audience to utilize the information shared, and do they have the power/ability to affect change with the research findings?” We are in the preliminary stages of developing these resources but intend to house them within a “PI Toolkit” where researchers can find support ranging from walkthroughs for UNM research processes to standard grant templates to documents with more introspective reflection questions like these. We are not doing this work in a vacuum and intend to also refer researchers out to existing resources like the ARIS BI Toolkit and, locally, the guides and trainings provided by UNM’s Graduate Studies Department, Office of Community Engagement, and Interdisciplinary Science Co-op.

From Conceptualizing BI Projects to Writing NSF BI Statements

Researchers who responded to our survey were noticeably more confident in their ability to conceptualize and carry out BI projects than they were with their ability to write NSF BI statements, highlighting a clear gap that could be filled by the ARIS BI Toolkit (Center for Advancing Research Impacts in Society, n.d.). Since UNM researchers are already confident in their ability to conceptualize projects, it is unlikely they will take hours to navigate the entire ARIS BI Wizard, which walks users through a detailed, step-by-step process that considers BI projects in the context of their relevance, target audiences, project goals, budget, etc. Instead, researchers are looking for a tool that can facilitate efficiently translating existing ideas into a complete and concise statement appropriate for an NSF proposal. As such, our recommendation for researchers who have started drafting their BI statement would be to utilize the ARIS BI Checklist, which reorganizes the ARIS BI Guiding Principles document in a way that is more accessible at a glance. The Checklist provides prompting questions and considerations for each of NSF’s BI review criteria, supporting more nuanced thinking about BI projects. Applicants can check off the questions they’ve already addressed and go back and add text to their proposal to flesh out anything they missed.

Yet, we could not help but ponder whether our survey results indicated an over-confidence in researchers’ ability to conceptualize BI projects when key details have been overlooked. To stay ahead of this potential issue, we plan to integrate

critical reflection about creating and implementing BI projects into new and existing research programming delivered by our office. The ARIS BI Wizard can support this by providing brief, hands-on, interactive activities that we can facilitate with researchers. We view the BI Wizard like a teacher’s edition of a textbook, so we do not need to reinvent exercises and activities from scratch. For example, the BI Wizard contains a “Higher or Lower” game that gives examples of common BI activities and a price. Then, players guess whether the actual cost of the activity is higher or lower. This is a quick, fun way to get researchers to realize the need to budget appropriate resources to both research activities and BI activities. We also plan to develop resources about research relationships that can supplement the BI Wizard and support more critical reflection about who is engaged in the research process, why, and how.

Areas for Further Research and Conclusion

This context-specific exploration of broader impacts in research has highlighted several areas where research development support and resources can enhance the effectiveness of societal contributions of research. Our survey findings provide a framework for advancing research practices at UNM and potentially at similar institutions, focusing on the importance of societal impacts, the centrality of relationships, and the alignment between writing BI statements and carrying out meaningful BI projects.

Our findings underscore that societal impacts are not ancillary but central to researchers’ sense of purpose and the meaningfulness of their work, thus reinforcing the connection between personal purpose and broader societal outcomes. Moreover, the role of relationships in research is paramount. Effective engagement with both collaborative partners and target audiences is crucial for designing research with authentic societal benefits. Finally, addressing the gap between conceptualizing BI projects and articulating them in grant proposals is essential.

Our recommendations aim to bridge the identified gaps and support researchers in achieving more impactful societal contributions. By emphasizing the integration of personal and societal values, enhancing relationship-building practices, and refining the articulation of BI projects, we believe that researchers at UNM—and potentially at other institutions—can more effectively contribute to societal well-being and drive meaningful change through their work. As

we move forward, our ongoing efforts will continue to focus on these key areas, providing researchers with the tools and support necessary to fulfill their broader impacts and achieve their research goals.

Based on our case study, we recognize there is more research and program development we can do. For example, we hope to think more about student engagement and mentorship in the future. Students serve a boundary-spanning role as both target audience members and collaborators in projects that include student engagement as part of a BI plan. Directly addressing this dual role could benefit the faculty-student relationship and the project outcomes. Similarly, mentoring rarely receives the same level of attention, evaluation, and recognition as other aspects of professional development for researchers. Therefore, we hope to do more work to support researchers as they build student mentorship into their funding proposals.

Lastly, there are sponsor-centered questions about BI project development that warrant more attention in future work. For example, is the makeup of review panels adequately representing the type of expertise that is critical in creating different types of social impact (economic, cultural, environmental, policy, etc.)? Is it reasonable to expect discipline-specific natural/physical scientists to equally understand how to apply their basic research to create societal benefits? To affect meaningful change in how broader impacts are prioritized in research, we believe these institutional questions are important to address on the part of research institutions and funders—particularly the National Science Foundation. Ultimately, addressing these emerging research needs and institutional questions will be critical for refining how broader impacts are integrated into research, thereby enhancing the societal value and effectiveness of scholarly work and driving significant, positive change.

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