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DR MARY ROSE CALDERONE HAAS (Orcid ID : 0000-0002-9506-5928)

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Authors: Mary R. C. Haas, MD¹, Kellen Haley², Bella Shah Nagappan, MD¹, Felix Ankel, MD,³
Anand Swaminathan, MD,⁴ Sally A. Santen, MD, PhD⁵

Author Affiliations:

¹Department of Emergency Medicine, University of Michigan Medical School, Ann Arbor, MI,
USA

²Virginia Commonwealth University School of Medicine, Richmond, VA, USA

³Department of Emergency Medicine, Regions Hospital, HealthPartners Institute, University of
Minnesota Medical School, Minneapolis, MN, USA

⁴Department of Emergency Medicine, St. Joseph's Regional Medical Center, Paterson, NJ, USA

⁵Department of Emergency Medicine, Virginia Commonwealth University School of Medicine,
Richmond, VA, USA

Corresponding author:

Mary R. C. Haas, MD

1500 E. Medical Center Drive

Ann Arbor, MI 48109, USA

Tel: 248-770-9169

Email: calderom@med.umich.edu

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Pull outs:

“Connections foster learning, collaboration, dissemination of content, and career satisfaction.”

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“PLNs draw upon several concepts in education theory.”

“Leveraging weak ties can fuel significant development in unique and unexpected ways.”

“The expansion and maintenance of PLNs can benefit both trainees and faculty.”

“Web 2.0 allows for connections with new nodes despite geographic distances through social media platforms”

BACKGROUND

An educator's impact is amplified through the power of connections. Connections foster learning, collaboration, dissemination of content, and career satisfaction. Personal learning networks (PLNs) are informal networks connecting people and organizations that allow for individualized learning and engagement in personal and professional development. Faculty must develop and manage their own PLNs while guiding trainees (i.e. students, residents and fellows) to do the same.

Connections that occur in-person or via technology-facilitated venues can drive the formation of PLNs. Web 2.0, which refers to social use of the web, can accelerate PLN development through platforms that facilitate collaboration as well as the creation, curation, sharing and consumption of educational content.¹ These tools include blogs, Twitter, Facebook, Instagram, LinkedIn and other social media networking sites. With the increased connectivity offered by these tools, learning and relationships are no longer limited by time and space.² PLNs that take advantage of the interconnectedness allotted by Web 2.0 allow individuals to connect and learn anywhere, anytime, from nearly anyone.²

In this Teaching Toolbox, we describe the education theory underlying PLNs and provide practical steps for faculty to develop their own PLNs and to mentor trainees through the same process.

EDUCATION THEORY UNDERLYING PERSONAL LEARNING NETWORKS

PLNs draw upon several concepts in education theory.³ **Connectivism**, originally attributed to George Siemens, is one prominent theory around which PLNs are centered.^{3,4} Connectivism postulates the following: learning can reside outside of oneself, learning requires the connection of various specialized information sets, and connections enable us to move beyond our current state of knowing.^{3,4} Accordingly, PLNs allow for learning to occur through the process of connecting with others.

Constructivism, attributed originally to Lev Vygotsky, also relates to PLNs in that it emphasizes the role of context and social interaction on knowledge acquisition.^{3,5,6} In contrast to theories that assume there is one objective truth, constructivism assumes that learners construct knowledge subjectively as they interact with their environment and attempt to make meaning of experiences.^{3,5,6} The interactions that occur between members of a PLN can thus drive an individual to construct new knowledge.

Another foundation to the social aspect of learning is known as **Communities of Practice (CoP)**. Originally described by Jean Lave and Etienne Wenger, CoPs refer to social learning systems that exist within broader social systems.⁷ Within CoPs, group members come to an agreement about group norms, build interpersonal relationships, determine the focus of the group's work, and share resources.⁷⁻⁹ Although originally developed to describe individuals who interact in person, Web 2.0 has facilitated the formation and development of CoPs online.⁹ There is often significant overlap between one's PLN and CoP, although members of a PLN do not necessarily share the same focus or trade as members of a CoP often do.

DEVELOPING & UTILIZING PERSONAL LEARNING NETWORKS FOR FACULTY AND TRAINEE DEVELOPMENT

PLNs can be conceptualized in practice by expanding upon the theory of connectivism, which employs the metaphor of a network with nodes and connections.⁴ A node is any unit that can connect to another unit, such as an individual or organization. Learning occurs through the process of creating connections and expanding network complexity.⁴

The quality of a node's ties to another node within a network can be categorized as strong, weak or absent. Weak ties, which refer to relationships with nodes farthest outside of one's immediate domain, can be mistakenly interpreted to be less valuable than strong ties. However, leveraging weak ties can fuel significant development in unique and unexpected ways.¹⁰ While the strongest ties share much of the same knowledge and perspectives, more distant acquaintances (weak ties) often provide exposure to new ways of thinking and opportunities.¹⁰ Personal learning networks are fluid, with weak ties becoming strong ties and new nodes constantly entering the network. See **Figure 1** for an example of a PLN.

The expansion and maintenance of PLNs can benefit both trainees and faculty. Trainees should begin developing PLNs early to accelerate career advancement through networking, collaboration on projects that fuel scholarly work, and identification of new opportunities. Faculty should maintain healthy PLNs in order to drive their own development through the same mechanisms. Additionally, faculty educators should utilize their own PLNs to augment their

ability to mentor, sponsor and coach trainees who can benefit from that faculty member's connections.

Although PLNs require significant investment of time and energy, they can generate major return in terms of learning, productivity and career advancement. Below are practical recommendations for developing and utilizing PLNs:

Set Specific Goals. Developing a PLN requires direction, and must be based on personal goals.¹¹ Example goals can include the following: to learn more about particular areas, to expand an educator's portfolio, to generate additional scholarly work, to serve in a leadership role, to develop a presence within a community of individuals who share a particular interest, to identify a mentor, coach or sponsor, and to improve one's ability to coach, mentor or sponsor trainees through linking them with members of their PLN. Intention and authenticity will strengthen the relationship with ties and maximize the likelihood of achieving goals.

Harness the power of Web 2.0 and social media with a professional Twitter profile. Web 2.0 allows for connections with new nodes despite geographic distances through social media platforms.² Twitter, in particular, provides an easy way to follow individuals, current issues, conference updates and/or timely topics pertinent to one's career or topic of interest. See **Figure 2** for specific strategies. Although social media can accelerate PLN development, users must diligently avoid pitfalls with potentially devastating consequences, such as sharing protected patient information or posting unprofessional or inaccurate content.¹²

Utilize PLNs to collaborate on research and scholarly work. Nurture relationships with the nodes in your PLN. Maintain communication with both strong and weak ties, updating them on your research and offering assistance. Consider connecting people within your PLN to help foster the expansion of their networks.

Intentionally foster relationships with international nodes in addition to local, regional, and national nodes. Reciprocal, generative relationships can rapidly emerge between educators operating in similar but unique contexts. Networks that transcend geographical limits have the potential to enrich international CoPs, address challenges facing health professions education across the globe, and beget broad-based impact.

Recognize the power of weak ties. Weak ties often bloom from unexpected and unique arenas.¹⁰ Intentionally seek opportunities to form new relationships with weak ties. Leverage weak ties to foster innovation and creativity.

Draw upon the expertise of others in the PLN to answer clinical and nonclinical questions. Twitter users can poll a panel of experts within a PLN to generate discussion about a particular topic or clinical controversy. Prior to incorporating information gained via this mechanism into clinical practice, however, ensure that it meets the same standards as textbooks and peer-reviewed resources. Ask for references wherever possible.

Generate a virtual, asynchronous journal club. PLNs can provide a forum to interpret and discuss implications of emerging research via an online journal club.¹³ If you encounter a

potentially practice-changing journal article, utilize a PLN to generate a Twitter discussion about its implications, strengths, and limitations. This conversation can occur asynchronously and will remain accessible for later reference.

Participate in the “backchannel” and share content presented at live conferences asynchronously. Twitter can also connect individuals who are physically present at a particular conference, or who follow conference content asynchronously.¹⁴ Often, members of an audience during a presentation will tweet thoughts, pearls and questions about the presentation content, thereby generating the Twitter “backchannel.”¹⁴ Participating in these conversations can catalyze a connection with another individual present at the conference, or with an individual not present at the conference but with a shared interest that has brought you both to the same conversation.

Access, contribute and share helpful resources developed by others. Share resources such as educational blog posts and practice-changing or thought-provoking journal articles with members of your PLN. Review content similarly shared with you by members of your PLN.

Find mentors, coaches and sponsors for yourself and your trainees. A sponsor is someone within your field, usually at a higher professional level, who works intentionally to advance your career by assigning new leadership roles, advocating for promotions, encouraging and guiding riskier career choices.¹⁵ Pull on the resources of strong ties to identify individuals to fill these roles. Seek out colleagues or trainees in need of a mentor, coach or sponsor and utilize connections to help them.

Develop an action plan. **Appendix A** provides a worksheet for educators to use for themselves and when teaching trainees the concept of a PLN. In this worksheet, list goals, map out an existing PLN, and plan specific actions to further expand a PLN.

CONCLUSIONS

PLNs are informal networks connecting people and organizations that allow for individualized learning and engagement in personal and professional development. Education theory underlying PLNs includes connectivism, constructivism and communities of practice. The most robust PLNs incorporate connections developed via both in-person and technology-facilitated experiences. Several strategies, including professional use of social media, can assist faculty educators and trainees with creating and maintaining PLNs.

Figure 1. Example PLN. This figure demonstrates an example PLN that includes both personally-facilitated and technology-mediated connections. The PLN incorporates a variety of individuals with both strong ties (represented by a solid line) and weak ties (represented by a dotted line).

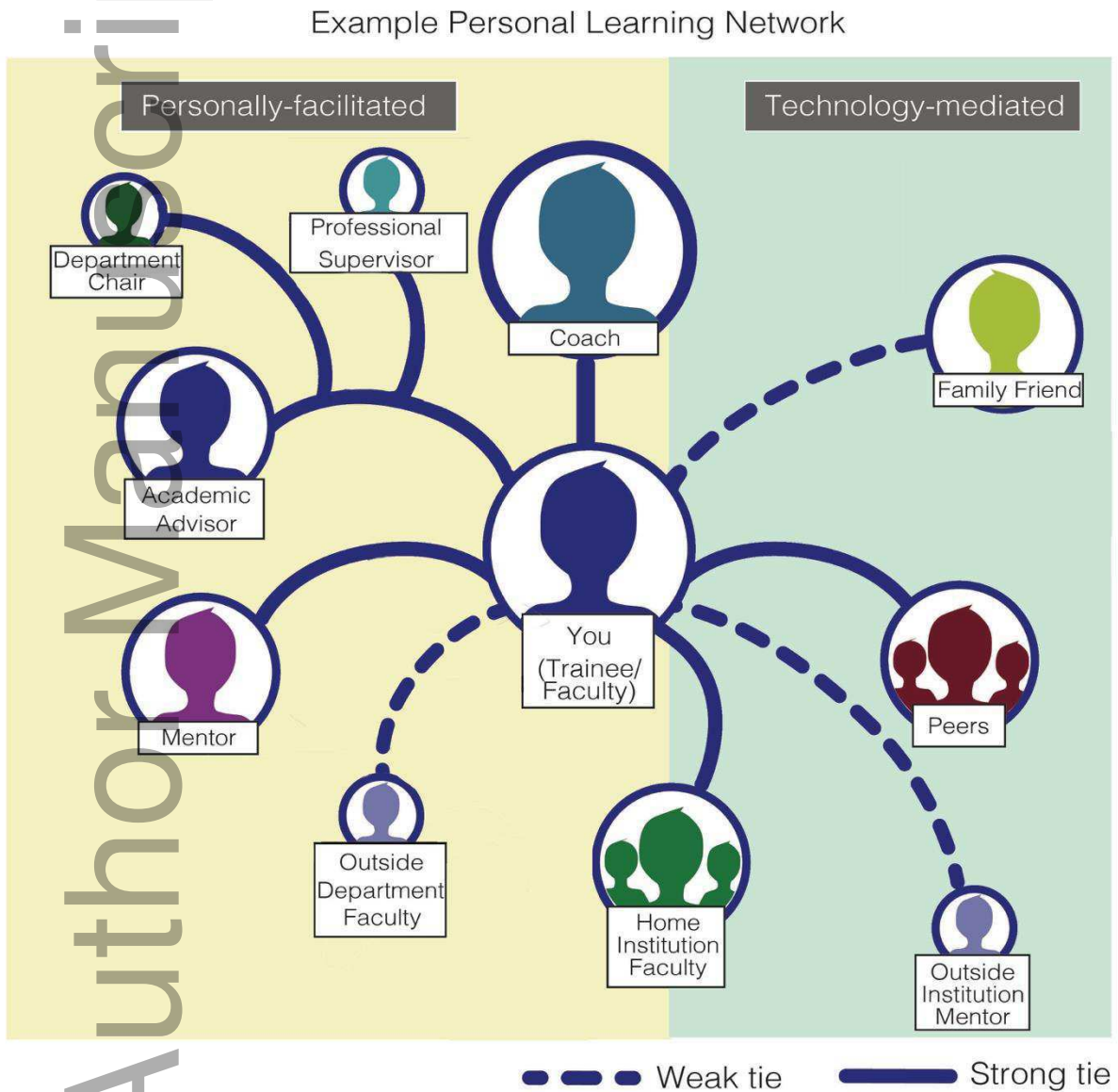


Figure 2. Strategies for Harnessing the Power of Web 2.0 and Twitter. This figure provides an example professional Twitter profile and outlines recommendations for utilizing Twitter to cultivate both strong and weak ties.

Harnessing the Power of Web 2.0 and Twitter

1. Create a professional Twitter profile
2. Choose a professional photo
3. Comply with your institution's social medial policy
4. Use Twitter at conferences
5. Incorporate the conference or topic hashtag to join conversations
6. Focus on quality over quantity
7. Remain respectful in all of your interactions

First name Last Name
@FirstLast
Physician, Medical Educator, FOAMed.
Tweets are my views only and not medical advice.

104 Following 38 Followers

Tweets Tweets & replies Media Likes

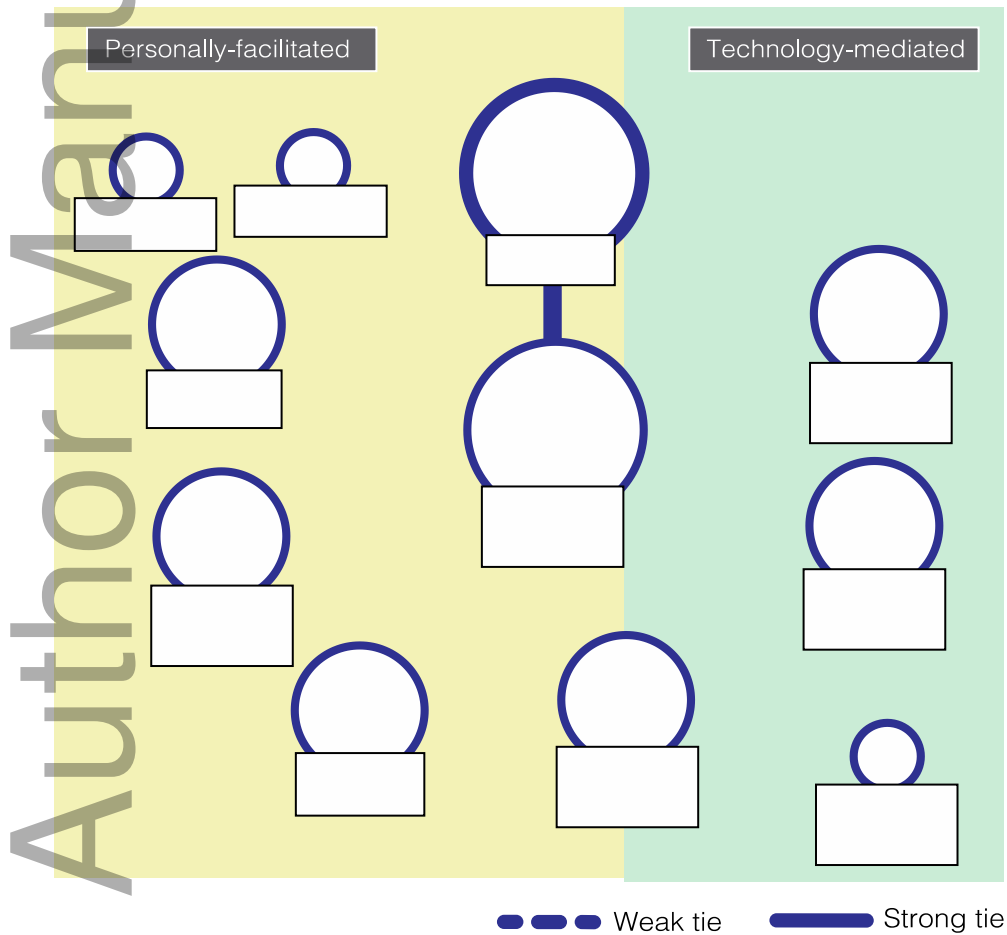
First name Last name
Just read a great article about Personal Learning Networks - www.pubmed.com/PLN. What suggestions do others have for connecting and building their network? #MedEd

Appendix A. PLN Worksheet.

Personal Learning Network Worksheet

You are ready to start building your own personal learning network (PLN). Follow the guidelines below.

1. Identify your goals.
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
2. Map out your PLN. List specific names of people that you consider a part of your network. Add additional ties as needed and ask yourself if there are others you would like to be a part of your network.



3. Come up with an action plan. Use your specific goals to guide your plan. Use the following example to help brainstorm ideas for your own action plan.

<p>Set Specific Goals</p> <p>Follow mentors or role models on Twitter</p>	<p>Access, contribute, and share helpful resources developed by others</p>	<p>Find mentors, coaches, and sponsors for yourself and your trainees.</p> <p>Recognize the power of weak ties</p>	<p>Share content presented at live conferences</p>	<p>Generate your own virtual, asynchronous journal club</p>	<p>Utilize connections to collaborate on research and scholarly work</p>	<p>Intentionally foster relationships with international nodes</p>
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<p>Set Specific Goals</p>						

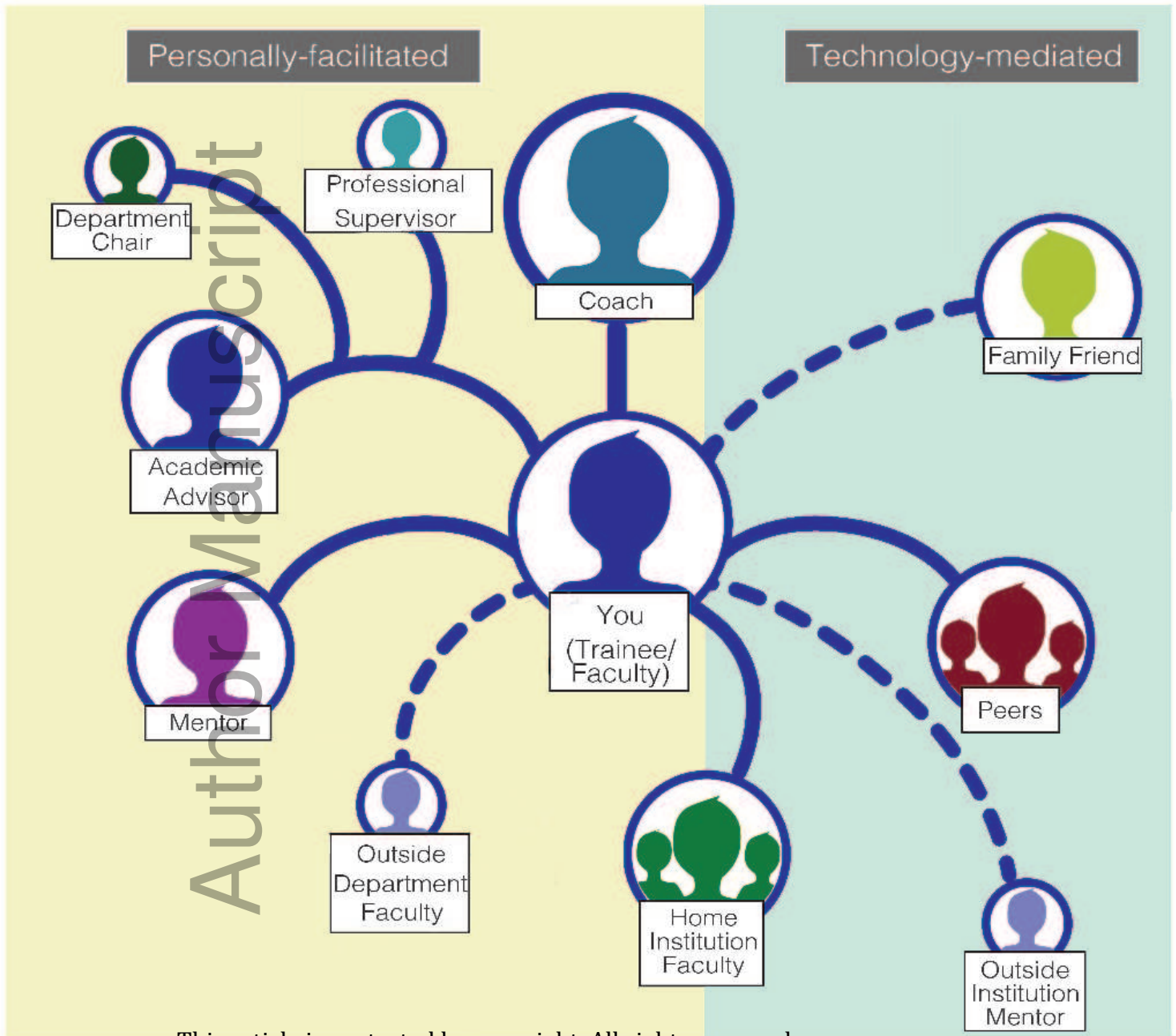
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Example Personal Learning Network

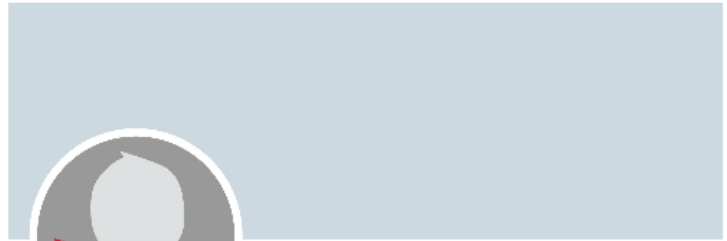


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Weak tie Strong tie

Harnessing the Power of Web 2.0 and Twitter

1. Create a professional Twitter profile
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Tweets

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Media

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Just read a great article about Personal Learning Networks - www.pubmed.com/PLN. What suggestions do others have for connecting and building their network? #MedEd

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