Fonds de recherche du Québec

Nature et Technologies Santé Société et Culture

Next Generation Researchers in Research Groups Funded by Fonds de recherche du Québec

Developing and Enhancing their Potential

Intersectoral Student Committee Report

March 2021

Québec

To reach the committee: cie@frq.gouv.qc.ca

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List of acronyms and abbreviations used in this document

CIE	Intersectoral Student Committee
CIUSSS	Integrated University Health and Social Services Centre
CR	Research Centres
FRQ	Fonds de recherche du Québec
FRQNT	Fonds de recherche du Québec – Nature et technologies
FRQS	Fonds de recherche du Québec – Santé
FRQSC	Fonds de recherche du Québec – Société et culture
IUCAU	University-affiliated institutes and centres
MSSS	Ministère de la santé et des services sociaux
NCE	Networks of Centres of Excellence of Canada
RG	Research group
RS	Strategic Clusters
RS-C	Strategic Clusters: Centres
RS-R	Strategic Clusters: Networks
RT	Theme Networks
QRIS	Quebec Research and Innovation Strategy (Stratégie québécoise de la recherche et de l'innovation)

The Intersectoral Student Committee

The Intersectoral Student Committee (CIE) is a statutory committee common to the boards of directors of the three Fonds de recherche du Québec (FRQ) – Nature and technologies, Health and Society and culture. The committee's mandate is to advise the chief scientist of Québec and the boards of directors of the FRQ by identifying strategies to promote the accessibility of research funding, optimize the potential of the next generation of researchers, and enhance their influence and impact on society.

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Acknowledgements

The CIE would like to thank the scientific directors of the FRQ, programs and partnerships management, and program officers for their support in the development and implementation of this project. It also thanks the directors and next generation researchers of Quebec's research groups as well as the federal program administrators who took part in the various consultations. Finally, the CIE thanks former members Jean-Christophe Bélisle-Pipon and Julie Morin-Rivat for their contribution to the project.

Summary of courses of action

★ - *high priority* | ☆ - *moderate priority*

Courses of action for the Quebec Research Funds (FRQ)
1. Improve communications between next generation researchers and research groups (RG).
1.1. Establish guidelines for the implementation of a "Next generation researchers Guide" in each RG. ★
1.2. Conduct regular awareness campaigns to foster interest and inform next generation researchers on the opportunities offered by RGs. ☆
1.3. Fund a "Research Group Student Forum" organized by the CIE. ☆
2. Allow RGs to broaden their affiliation criteria for next generation researchers conducting research related to their research themes
2.1. Allow research groups to authorize affiliation for student and postdoctoral researchers who are supervised by a regular, associate or collaborating member. ★
2.2. Allow research groups to authorize affiliation for all types of students and postdoctoral researchers, including college students. ★
3. Encourage the involvement of next generation researchers in the activities and governance structures of RGs.
3.1. Include student involvement and participation in governance in the evaluation criteria for FRQ training award applications[1]. ★
3.2. Encourage next generation researchers to participate in the governance of the research groups. ★
3.3. Establish an award recognizing next generation researcher involvement and governance experiences. ☆
4. Improve RG grant programs to better integrate next generation researchers in the RG ecosystem.
4.1. Reassess the evaluation criteria and sub-criteria pertaining to next generation researchers in all FRQ RG grant programs with the intention of achieving their full potential ★
4.2. Authorize and specify that funding for an RG-affiliated student committee is an eligible expense. ☆

[1] This recommendation applies to involvement and participation in governance in general, not only within the RG, in the context of a master's, doctoral or postdoctoral training award.

Courses of action for research groups

1. Increase the involvement of next generation researchers in the structure of the RG.

1.1. Encourage and support initiatives coming directly from next generation researchers, and offer opportunities to be involved within the RG. ★

1.2. Involve next generation researchers in the governance of the RG. ★

1.3. Systematically consult next generation researchers when discussing issues relating to them. ★

2. Improve communications between next generation researchers and RGs.

2.1. Create, share and regularly update a "Student Researcher Guide" produced in collaboration with next generation researchers. ★

2.2. Develop efficient means to generate up-to-date data on affiliated next generation researchers. ☆

3. Broaden the affiliation criteria and improve access to funding for next generation researchers conducting research related to the research themes of the RG.

3.1. Authorize affiliation for student and postdoctoral researchers who are supervised by a regular, associate or collaborating member. ★

3.2. Authorize affiliation for all types of student and postdoctoral researchers, including college students. ★

3.3. Periodically reassess and update the eligibility criteria for next generation researcher funding and systematically provide access to competition evaluation criteria. ☆

Course of action for student and postdoctoral researchers

1. Establish an organizational memory and become actively involved in the RG.

1. Background

Research groups (RG)[2] funded by the FRQ are alliances of researchers, research teams and next generation researchers from various disciplinary backgrounds and academic units and institutions (Quebec Research and Innovation Strategy [QRIS] 2017-2022, p.47). These RGs are valuable places for exchange and initiation and training in research. Their objectives are to promote collaborative research, support new researchers, and encourage all forms of local, provincial, national and international collaboration, usually revolving around a common theme. RGs promote research excellence by focusing on dissemination, transfer and valorization of research results and creating of hubs of expertise.

RGs represent a significant budget item for each of the three Fonds: approximately one-third of the total annual budget of the FRQ is invested in RGs, which empowers them to contribute effectively to the vitality, excellence and influence of research in Quebec. This funding represents nearly $366 million over five years (2017-2022), including $61.7 million from the QRIS.

In addition to providing structure for research activities and promoting networking among researchers, RGs play a critical role in hosting, training, and supporting college, university and postdoctoral next generation researchers[3].

An internal study conducted by the CIE in 2015 examined the involvement of next generation researchers in RGs and their involvement in the governance of 24 RGs funded by the three FRQ (eight RGs per Fond). This study also revealed a lack of access to documents governing RG activities, a diversity of student statuses, and a low level of student involvement in RG governance. Only seven out of the 24 RGs analyzed actively involved next generation researchers in governance committees or allowed student representation at board meetings. Even within these seven RGs, the nature and scope of student involvement in governance and in RG's activities were partial and implicit. Despite being at the heart of RG activities, the advisory role of next generation researchers in guiding best practices for their support and development was found to be limited in our sample. The observations and analyses from this preliminary study prompted the CIE to take a more in-depth look at the situation of next generation researchers in RGs and served as guidelines for determining the direction of the consultation.

[2] Given the variety of names used to describe entities that bring together, network and share services and infrastructures among researchers (cf. Table 1), this report will use the term Research Group (RG).

[3] See the rules of the RG grant programs of the 3 Quebec Research Funds.

2. Method

Building on its previous work, the CIE examined four key dimensions of the next generation researcher experience to propose courses of action aimed at developing and enhancing the potential of next generation researchers in RGs.

Box 1: Four dimensions of the next generation researcher RG experience

Status:	Types of next generation researcher affiliation
Support:	What RGs can do for next generation researchers (structure, form, and accessibility)
Involvement:	What next generation researchers can do for RGs (participation, support, and role)
Governance:	Student researchers' place in RG governance

To explore these dimensions of interest, we adopted a four-step approach:

1. Analysis of provincial RG grant programs and consultations with key FRQ administrators;
2. Analysis of federal programs[4] similar to the provincial RG programs and meetings with federal program administrators and the directors of some of these RGs;
3. Consultation with RG directors and next generation researchers;
4. Formulation of courses of action based on our analyses and consultations.

2.1 Analysis and consultation with the Fonds de recherche du Québec

First, all RG programs of the three Fonds de recherche were analyzed to identify relevant information about next generation researchers. This step made it possible to ascertain the stated objectives of the FRQ programs (March 2020 version) regarding the role of next generation researchers in the RG and what the RG has to offer them. Following this analysis, the administrators of the assigned programs were consulted to answer any questions that remained unanswered.

Given the wide range of research sectors, issues and funding opportunities, there is considerable heterogeneity in the structure and mission of different RGs. This diversity is strongly encouraged and is one of the strengths of the RGs. It allows for better coverage of priority research issues, respect for the cultures of different research communities, and the emergence of new ideas, collaborations and innovations. However, from an analytical point of view, clearly identifying the role and issues specific to next generation researchers within the different groups is a complex task. Table 1 presents the FRQ research group grant programs[5] as well as the number of groups funded by each program[6].

[4] Federal agencies: Social Sciences and Humanities Research Council (SSHRC), Natural Sciences and Engineering Research Council (NSERC) and Canadian Institutes of Health Research (CIHR)

[5] FRQNT innovation networks (n = 2) were removed from the study due to a lack of respondents. FRQSC research teams (n > 100) were also removed, as the nature of the program is too different from the other RG programs.

[6] Data from July 2020, when the surveys were sent out.

Table 1: Types of RG grant program by Fonds de recherche, and number of groups per program.

Fonds	Program	Number
FRQNT	1. Strategic Clusters (RS)[7]	36
FRQS	2. Research Centres (CR)	22
FRQS	3. Theme Networks (RT)	20
FRQSC	4. Research infrastructure support for social sector university-affiliated institutes and centres (IUCAU)[8]	10
FRQSC	5. Strategic Clusters: *Centres (RS-C)*	25
FRQSC	5. Strategic Clusters: *Networks (RS-R)*	4

2.2 Analysis and consultation with federal programs

The CIE also analyzed two federal programs, Networks of Centres of Excellence (NCE) and the Canada First Research Excellence Fund (CFREF). According to the NCE home page, the program supports large-scale academically led research networks that harness the creativity and inventiveness of Canadian health, natural, and social scientists and engineers. Partners from industry, government and not-for-profit organizations contribute additional expertise and nearly $90 million per year of cash and in-kind support[9]. For its part, the Canada First Research Excellence Fund invests approximately $200 million per year to help Canadian universities, colleges, and polytechnics become global research leaders and to create long-term economic advantages for Canada[10].

Although the amounts allocated by federal programs differ from those of the FRQ programs, this analysis provided us with a wide range of points of comparison. Those guided our focus and fed our reflections on the forms of investments intended for next generation researchers and on the place held by next generation researchers within the entities funded by the programs."

Table 2 shows the number of grants awarded for each federal program studied. After reviewing public information, we met with different administrators of the two federal programs to better understand the role of next generation researchers within them.

[7] As Calcul Québec is more of a user platform than an RG, it was removed from the analysis.

[8] For information, an FRQSC IUCAU is a university-affiliated institution (Institute or Centre) that is part of the health and social services network (now called Integrated University Health and Social Services Centres [CIUSSS]), unlike FRQSC strategic clusters (RS-C), which are more closely affiliated with a university. IUCAU are institutions attached to the Ministère de la Santé et des Services sociaux (MSSS), with a university mission (research component) funded by the FRQ, while RS-C are not directly attached to a government ministry or department.

[9] https://www.nce-rce.gc.ca/Programs-Programmes/NCE-RCE/Index_eng.asp

[10] https://www.cfref-apogee.gc.ca/about-au_sujet/index-eng.aspx

Table 2: Federal programs analogous to the FRQ RG programs and number of groups per program.

Agency	Program	Number
Federal	Canada First Research Excellence Fund	18
Federal	Networks of Centres of Excellence	38

2.3 Consultation with RG directors and next generation researchers.

The CIE consulted the directors and next generation researchers of RGs using two separate surveys, hereafter referred to as the "director survey" and the "student survey". The surveys consisted of 71 and 88 questions respectively. The quantitative and qualitative data were then analyzed and compared.

2.4 Formulation of courses of action

Courses of action were developed following the analysis of all results presented in this report, namely: 1) the analysis of RG grant programs funded by the FRQ, 2) the analysis of federal programs analogous to the provincial RG programs, 3) the qualitative data from interviews with program administrators and federal research groups, and 4) the results of the "director survey" and the "student survey". To assess the feasibility of the courses of action, we then presented them to the FRQ program officers and scientific directors.

3. Analysis of FRQ-funded RG grant programs and analogous federal programs

This section provides an overview of the available information on the four dimensions of the next generation researcher experience under the five FRQ programs and the two federal programs with similar objectives (Table 3).

Table 3. Information available on the four dimensions of the student experience under various FRQ RG grant programs and similar federal programs.

Agency	Program[11]	Status	Support	Involvement	Governance
FRQNT	1. Strategic Clusters[12]	Yes*	Yes	Yes *	No
FRQS	2. Research Centres	Yes	Yes	No	No
FRQS	3. Theme Networks	Yes	Yes	No	Yes
FRQSC	4. Research infrastructure support for social sector university-affiliated institutes and centres (IUCAU)	Yes	Yes	No	No
FRQSC	5. Strategic Clusters[13]	No	Yes	No	No
Federal	6. Canada First Research Excellence Fund	No	Yes	No	No
Federal	7. Networks of Centres of Excellence	Yes	Yes	Yes	No

*Changes in the FRQNT RS program rules for the 2022-2023 competition compared to the version of the program analyzed in March 2020.

A closer look at the support offered by research groups shows that it can take several forms. The most common forms of support are training[14], networking activities[15], services[16] and financial support[17] (Table

[11] The programs analyzed for this project were from March 2020. Some programs may have been updated since our analysis.

[12] Our analysis of the FRQNT RS program takes into consideration the changes that come into effect for the 2022-2023 competition, even though it was modified after March 2020.

[13] The FRQSC RS program includes both Centres and Networks. Although the two types of clusters may be quite different, they are covered by the same program. There will be no distinction between the cluster types in this section of the report.

[14] Training activities, graduate programs, summer school, symposia, science days, seminars, initiation to research.

[15] Integration of next generation researchers, exchange and networking opportunities, mentorships, internship hosting, supervision.

[16] Administrative assistant, librarian, administrative and IT support, animal resources, purchase of scientific books and journals, research ethics committee, statisticians, research professionals, common platforms and services.

[17] Travel grants, scholarship supplements, scholarships (graduate and postdoctoral), financial aid, internships abroad, student remuneration, student awards.

4). Support is the dimension of the student experience that is the most clearly defined in the programs and documents provided by the FRQ.

Table 4. Forms of support available for next generation researchers in FRG RGs and similar federal programs

Agency	Program	Training	Networking	Common services/ resources	Financial support
FRQNT	1. Strategic Clusters	Yes	Yes *	Yes *	Yes
FRQS	2. Research Centres	Yes	No	Yes	Yes
FRQS	3. Theme Networks	Yes	Yes	No	Yes
FRQSC	4. Research infrastructure support for social sector university-affiliated institutes and centres (IUCAU)	Yes	Yes	Yes	Yes
FRQSC	5. Strategic Clusters	Yes	Yes	No	Yes
Federal	6. Canada First Research Excellence Fund	Yes	Yes	Yes	Yes
Federal	7. Networks of Centres of Excellence	Yes	Yes	Yes	Yes

* Changes in the FRQNT RS program rules for the 2022-2023 competition compared to the version of the program analyzed in March 2020.

In a context where the development of diverse skills is encouraged among next generation researchers to facilitate a variety of career paths, RGs provide a particularly rich learning environment because of their complexity and their connections with different organizations and sectors[18]. RGs are an ideal environment for developing networking, management, and event or activity organization skills for next generation researchers. With the launch of its DIALOGUE[19] program, the FRQ encourage next generation researchers to engage in knowledge mobilization activities. Applicants to the DIALOGUE program must be proposed by their RG, and the mobilization activities must be part of the RG's strategic plan. This new program demonstrates the FRQ's desire to involve next generation researchers in organizing knowledge mobilization activities in collaboration with RGs.

[18] http://www.scientifique-en-chef.gouv.qc.ca/wp-content/uploads/Rapport-de-consultation-2017-CIÉ_VF.pdf
[19] FRQ DIALOGUE program – next generation researcher component, consulted in March 2020.

4. Survey results (next generation researchers, RG directors)

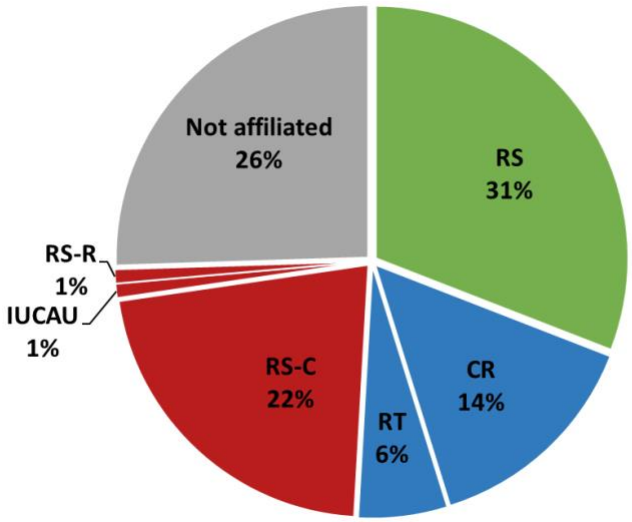
To simplify the presentation of the survey results, **aggregate data for all programs will be presented when the results are similar across programs**.

4.1 Profile of respondents

A total of 69 RG directors and 995 student and postdoctoral researchers responded to the two surveys launched in July 2020. The participation rate for RG directors ranged from 40% to 68% (average of 59%) depending on the RG program. It is important to note that the next generation researchers and directors who responded to the surveys were not necessarily from the same RGs, which could lead to differences when comparing the results of the two surveys.

The distribution of responses from next generation researchers across the different RG programs (Figure 1) suggests that RS (31%), CR (14%), RT (6%) and RS-C (22%) are strongly represented compared to IUCAU (1%) and RS-R (1%). However, it is important to note that the number of RGs funded by RS-R (n = 4) and IUCAU (n = 10) programs is lower than in other programs (average of 26). 25.5% of student responses were from next generation researchers with no RG affiliation.

Figure 1. Distribution of next generation researcher respondents by RG program (n = 995)



4.2 Profile of RGs

All the RGs that responded to the survey had a roughly similar composition, with an average of 72 regular members, 32 collaborating members and two honorary members per RG, except for the RT, which had an average of 227 regular members and 134 collaborating members. Concerning the number of employees, RS, RT, RS-C and RS-R had an average of 6 employees, while CR and IUCAU had an average of 169 and 73 employees, respectively. It should be noted that most RGs update their membership numbers on a continuous (60%), quarterly (10%) or annual (22%) basis.

When it comes to student and postdoctoral researchers, the RGs had an average of 296 members. It is important to note that 11% of the RGs did know the number of next generation researchers affiliated with them. Furthermore, when the RG directors were asked about the number of next generation researchers by the level of study, the data were not always available. As a result, only RGs with access to this information answered this section of the survey[20]. Only the RS, CR and IUCAU had data on college-level next generation researchers, with an average of six students per RG. At the undergraduate level, RS and RT had an average of seven student members, while CR and IUCAU had an average of 89. The average number of master's and doctoral students and postdoctoral fellows per RG was 120, 140 and 33 respectively, across all programs. It should be noted that most RGs update their next generation researcher membership numbers on a continuous (30%), quarterly (10%) or annual (48%) basis.

According to the results of the director survey, next generation researcher members come from a variety of academic institutions[21]. At the top of the list, 83% of RGs that responded to the survey had at least one next generation researcher member from Université de Montréal and McGill University, 72% from Université Laval, 64% from Université de Sherbrooke, 61% from Université du Québec à Montréal, 51% from Université du Québec à Trois-Rivières, 49% from Concordia University, 39% from Université du Québec à Chicoutimi, and 30% from Polytechnique Montréal. Fewer than 30% of RGs had student and postdoctoral researcher members from other academic institutions in Québec.

4.3 Next generation researcher awareness of RGs

An interesting finding of the survey was the lack of awareness of FRQ-funded RGs among a significant proportion of student and postdoctoral researchers. Of the respondents affiliated with an RG (n = 741), 41% reported identifying at least one new RG in their research field with which they are not affiliated. Of the respondents not affiliated with an RG (n = 254), 68% reported being unaware of the existence of RGs as the main reason for their absence of affiliation. Of these 68%, half identified one or more RGs in their research field (Figure 2). Of the respondents who identified an RG in their research field (n = 132), 92% would like to join this RG if they meet the affiliation requirements (Figure 3).

Figure 2. Identified at least one RG in their field of research (n = 254)

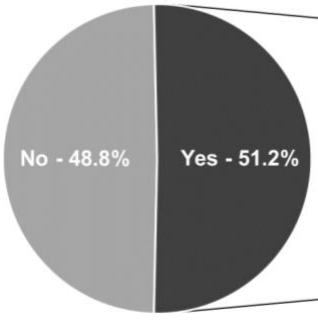
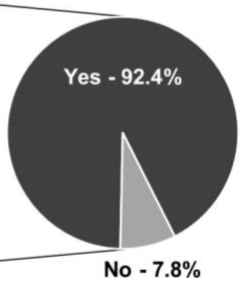


Figure 3. Intend to join this/these RGs if the affiliation requirements are met (n = 132)



[20] Number of RGs with data by level of study: college (5); undergraduate (15); master's (43); PhD (44); postdoctoral (49). Stratified averages by level of study were calculated based on the data reported by these RGs. It should be noted that 61 RGs knew the total number of next generation researchers.

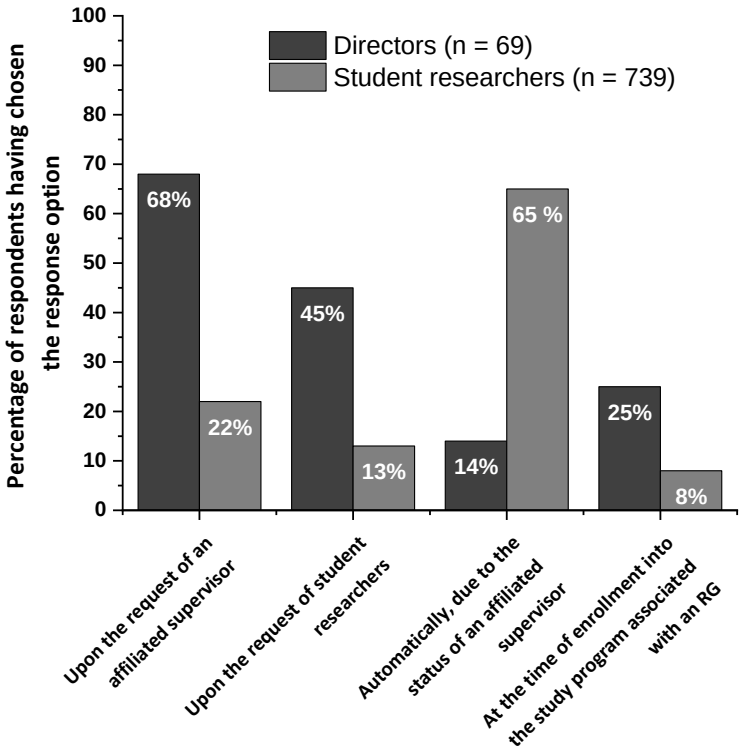
[21] Next generation researchers could choose between the 18 institutions on the Québec government's list of Québec universities or "other" (colleges and Cegeps). https://www.quebec.ca/en/education/university/studying/list-universities

4.4 Status

The eligibility of next generation researchers for RGs differs widely depending on their level of study. Only 19% of RGs accept college-level students, 57% accept bachelor's students, 96% accept master's students, 99% accept PhD students, and 100% accept postdoctoral fellows. Thus, many/most college and bachelor's students are denied affiliation to an RG even if they are conducting research related to the RG's research themes. In 91% of RGs, to be allowed affiliation, a next generation researcher must be supervised by an affiliated member. However, the status of the research supervisor can influence the student's eligibility. To support a student's application for affiliation, the supervisor must either be a regular member (95% of RGs), a collaborating member (41% of RGs), or an honorary member (16% of RGs).

Affiliation with an RG affects a next generation researcher's access to various resources, including support (e.g., training, networking activities, services, and financial support). When the responses to the director survey (ways of becoming affiliated with the RG) are compared to those of the student survey (how they became affiliated with their RG) (see Figure 4), significant differences can be observed. Indeed, how next generation researchers reported becoming affiliated is not the same as those identified and proposed by the directors. One hypothesis to explain this difference is that next generation researchers are unaware or uninformed of the ways in which students can become affiliated with their RG. Furthermore, 25% of next generation researchers indicated that they did not know their affiliation status or that it is not well defined by their RG (e.g., regular student member, collaborating student member, etc.). It should also be noted that a small percentage (8%) of next generation researchers have been affiliated with an RG without being aware of it.

Figure 4. Ways for next generation researchers to become affiliated with an RG



4.5 Support

4.5.1 Training

The vast majority of RGs (88%) offer training to their next generation researchers. When planning training activities, RGs focus on developing cross-cutting skills with broad applications such as networking and communication (84%), general skills such as research ethics and scientific writing (80%), theoretical skills related to the RG's research themes (74%), theoretical management skills such as funding applications, budgeting and partnerships (43%), and other types of skills (36%).

RGs offer an average of 12 training activities per year (RS = 13, CR = 20, RT = 5, IUCAU = 9, RS-C = 10, RS-R = 3). These activities are generally organized by RG employees (82% of RGs), next generation researchers (72% of RGs), RG-affiliated researchers (66% of RGs), or RG management (54% of RGs). The training is most often delivered by RG-affiliated researchers (95% of RGs), followed by non-affiliated invited researchers (74% of RGs), next generation researchers (64% of RGs), RG employees (54% of RGs), or other non-affiliated training providers (48% from outside the academic community and 41% from the academic community).

The choice of training activities is made following consultation with affiliated next generation researchers (74% of RGs), recommendations by an RG committee (69% of RGs), specific requests from next generation researchers (67% of RGs), consultation with affiliated researchers (54% of RGs), or specific requests from affiliated researchers (49% of RGs). Training can take different forms, which are presented in Table 5.

Table 5. Types of training offered by RGs

Type of training	Percentage of RGs that offer this training
Workshops	84%
Seminars	75%
Training linked to the RG's annual conference/science day	64%
Webinars	62%
Summer school	46%
Training in small groups over several days	26%
Online training modules	20%
Formal courses	18%
Other	16%

To identify the types of training best suited to the needs of next generation researchers, they were asked about the skills they hoped to acquire. The main topics of interest were theoretical aspects related to the RG's research themes, general skills (e.g., research ethics, scientific writing) and cross-cutting skills with broad applications (e.g., networking and communication). In addition, 66% of next generation researchers indicated that their RG provided the training they attended next generation researchers, thus emphasizing their importance in the academic career of next generation researchers.

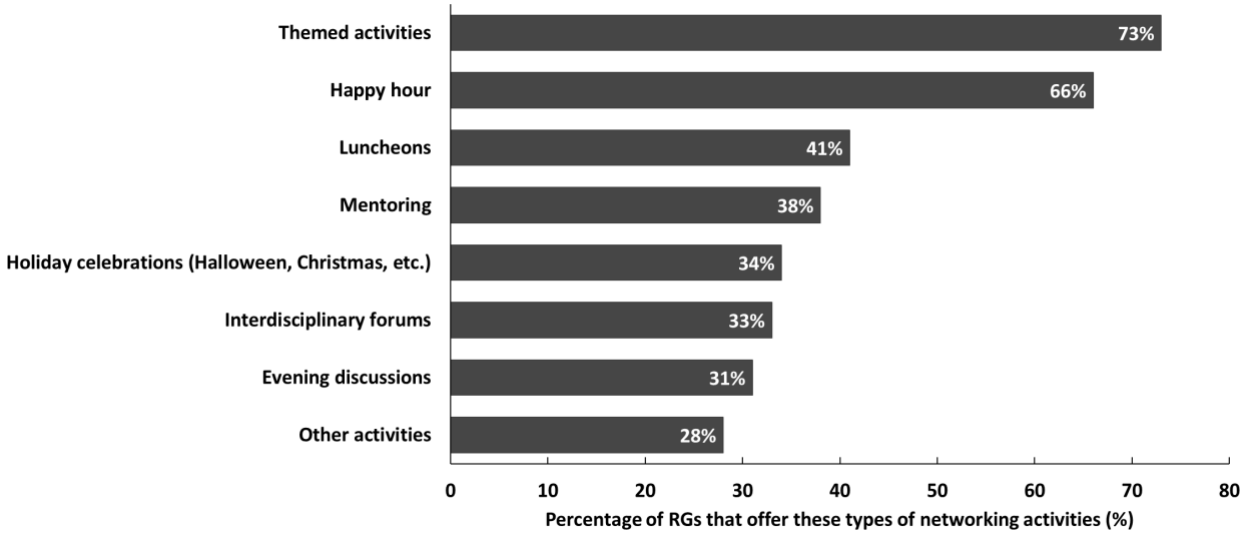
6% of next generation researchers indicated that they did not have access to training offered by their RG, while 31% did not know if their RG offers training. In general, seminars and training linked to the RG's annual conference or science day were the most popular. It is worth noting that formal or traditional courses were the least appreciated form of training among next generation researchers (3%).

4.5.2 Networking activities

Most RGs offer networking activities to their affiliated next generation researchers (93% of RGs). The most common forms are presented in Figure 5. In general, these networking activities aim to provide next generation researchers with an opportunity to interact with each other and with the other researchers of the RG, to promote a sense of belonging in the RG among next generation researchers, to develop cohesion and collaboration among the RG's next generation researchers, and to broaden the horizons for collaborations in relation to the RG's research program.

These networking activities are mainly organized by RG employees (89% of RGs), affiliated next generation researchers (77% of RGs), RG management (66% of RGs) and affiliated researchers (48% of RGs). The number of networking activities per year varies significantly between programs (RS = 5, CR = 12, RT = 3, IUCAU = 4, RS-C = 8, RS-R = 2).

Figure 5. Percentage of RGs that offer the most common forms of networking activities (n = 64)



Most next generation researchers (67%) indicated that their RG offers networking activities and that these activities are primarily intended for next generation researchers (73%). According to the respondents, the most suitable networking activities are those held in conjunction with the RG conference (28%) and mentorships (22%)[22]. In general, next generation researchers indicated that one to four networking activities per year would be ideal to meet their needs. During the pandemic, virtual networking activities have also been offered to compensate for the sharp decrease in this type of activity since spring 2020.

[22] Next generation researchers could choose between 10 types of networking activities. These two types were selected significantly more often than the others.

4.5.3 Services

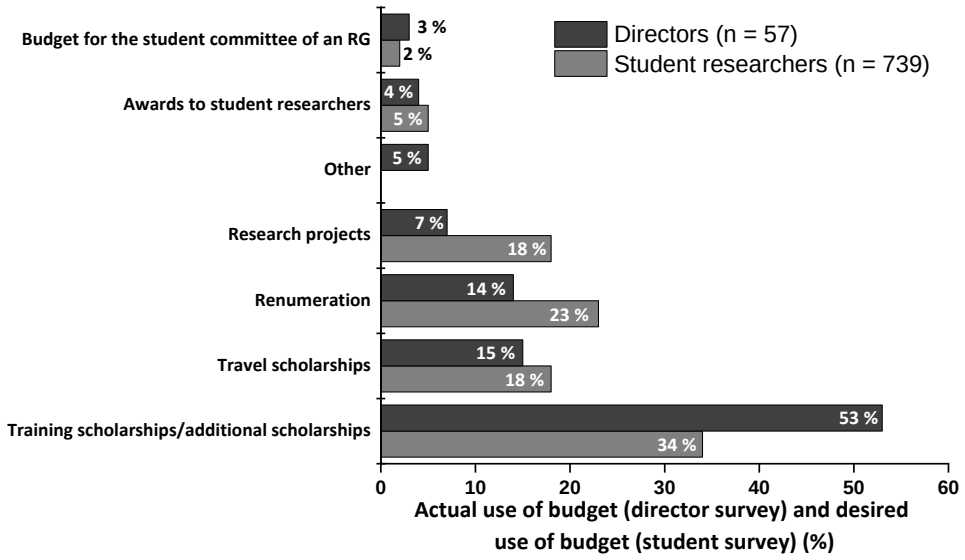
Services differ substantially between programs. Across all RGs, only 52% offer services for next generation researchers (RS = 39%, CR = 71%, RT = 11%, IUCAU = 75%, RS-C = 71%, RS-R = 50%). Of those, 72% offer communication services, 53% offer statistical services, 44% offer ethics and printing services, and 42% offer other types of services. According to the director survey, the most used services are: 1) statistical, 2) communication and specialist services (e.g., engineers, nurses, etc.), 3) printing, 4) ethics, and 5) mental health and well-being.

Among next generation researchers, 33% of respondents indicated that they had access to various services offered by their RG (e.g., statistical, printing, graphics, specialized staff). In addition, 45% reported that they were consulted to identify the most relevant services to meet their needs. Conversely, 52% of respondents indicated not knowing whether services were available, and 15% reported that their RG did not offer services. Among the different services available in RGs, statistical services (45%) and communication services (16%) were both the most popular ones and the most extensively used services according to the director survey.

4.5.4 Financial support

According to the director survey, all the RGs offer financial support to their affiliated next generation researchers, with a single exception. An average of 23.3% of an RG's total funding (from the FRQ and other revenues) is allocated to next generation researchers across all programs (RS = 20.3%, CR = 27.5%, RT = 16.6%, IUCAU = 25.5%, RS-C = 24.9%, RS-R = 25.0%). Among next generation researchers, financial support was by far the best-known form of support as 79% reported that their RG offers this form of support. A comparison between the current use of the budget allocated to next generation researchers according to the director survey and the optimal use of the same budget according to the student survey is presented in Figure 6. It highlights a few points. In particular, next generation researchers placed greater importance than directors on financial support for travel grants, salaries, and research projects, and less importance on training scholarships and scholarship supplements. A lack of knowledge about the impact of affiliation status on access to financial support can be observed, as 53% of next generation researchers were not aware of the relationship between the two.

Figure 6. Current use of the budget allocated to next generation researchers according to the director survey and optimal use of the same budget according to the student survey



When RGs offer funding competitions for next generation researchers, the most common assessment criteria are: 1) alignment with the RG's research themes (94% of RGs), 2) quality of the research project (91% of RGs), 3) academic excellence (83% of RGs), 4) relevance of potential collaborations (68% of RGs), 5) number of publications and participation in scientific conferences and symposia (53% of RGs) and 6) knowledge mobilization skills (37% of RGs).

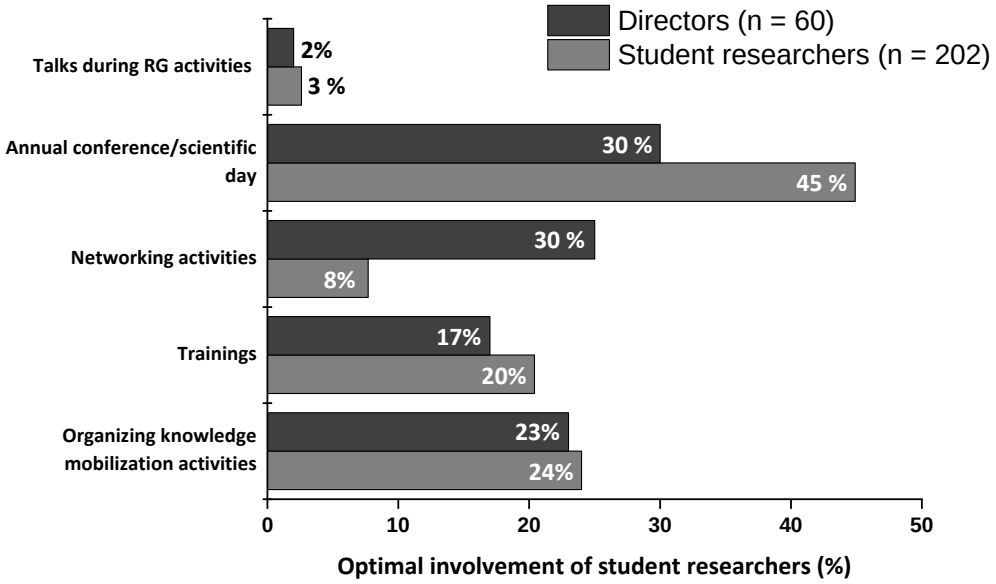
4.6 Involvement

87% of RGs consider their next generation researchers to be actively involved in their ecosystem. According to the director survey, next generation researcher involvement mainly occurs through ad hoc requests (73% of RGs), a permanent student committee or a network (68% of RGs), and event or activity committees or subcommittees (63% of RGs). The level of autonomy of next generation researchers varies across RGs: in 58% of RGs, next generation researchers have independent decision-making/vision of student involvement; in 57% of RGs, student involvement is largely related to the strategic plan; in 53% of RGs, next generation researchers are involved in activities related to the research themes of the RG; and 52% of RGs directly supervise the participation of their next generation researchers.

According to the director survey, the degree of next generation researcher involvement varies depending on the type of event or activity. From the most significant involvement (Likert scale; 5: almost no input from the RG, entirely managed by next generation researchers) to the least significant (0: no next generation researcher involvement), we find the organization of the annual conference/science day (3.7), networking activities (3.5), communication during RG events or science outreach/knowledge mobilization activities (3.3), training (3) and promotional events (2.1). Interestingly, 83% of RGs would like to see greater involvement from their next generation researchers, and 93% indicated that activities and events organized by next generation researchers are part of their strategic plan. However, only 64% of RGs included next generation researchers in developing sections of their strategic plan that are concerned with student-organized activities.

Directors (n = 60) and next generation researchers (n = 202; next generation researchers actively involved within their RG) alike identified the organization of the RG's annual conference or science day as a priority (Figure 7). Student involvement in organizaing training and knowledge mobilization activities also appears to be important to both directors and students. The high percentage of next generation researchers who are actively involved in their RG (43%) and have a say in the activities held (70%) demonstrates their interest in organizing events and a certain sense of belonging. Next generation researchers who are not involved in their RG identified a lack of time (66%) as the main factor limiting their involvement.

Figure 7. Optimal involvement of next generation researchers



4.7 Governance

80% of RGs indicated that next generation researchers are actively involved in the governance of their RG. Next generation researchers participate in the executive committee (69% of RGs), the scientific committee (44% of RGs) and other types of committees (36% of RGs). In 82% of RGs, next generation researcher seats are prescribed in the statutes, and 76% of next generation researchers who participate in governance have the same voting rights as other committee members.

Next generation researchers demonstrated a lack of knowledge regarding opportunities for involvement, as 58% reported not knowing whether next generation researchers can participate in governance. However, 39% of next generation researchers found that student participation in governance is important, and 36% found that it is recommended. Of the student survey respondents who participated in governance bodies, 42% said that a student member can sit on the executive committee, 30% on the scientific committee, and 31% on the research area/theme/program committee. Conversely, 35% said they do not know, and 10% reported that they held positions on other types of committees within their RG. In addition, 47% of student survey respondents indicated that next generation researchers are consulted in the development of the RG's strategic plan, while 49% did not know.

Despite strong student participation in various governance bodies, 58% of respondents from RGs in which students participate in governance said that they did not know if students sitting on committees have the right to vote. However, most next generation researchers felt that students sitting on governance bodies should have the right to vote.

5. Detailed courses of action

5.1 Courses of action for the Quebec Research Funds

1. Improve communications between next generation researchers and research groups (RG).

1.1. Establish guidelines for the implementation of a "Next generation researchers Guide" in each RG. ★

Next generation researchers are largely unaware of the benefits and forms of support offered by RGs. In addition, a significant proportion of them do not know whether their status is clearly defined by the RG. A guide would help inform next generation researchers about the RG to which they are affiliated, the benefits of affiliation (training, networking activities, services, financial support, etc.), and opportunities for involvement in the group (organization of conferences, governance, etc.). In addition, the guide could explain affiliation statuses, eligibility requirements, and access to financial support. This information would answer several questions raised by affiliated next generation researchers, 65% of whom do not know if affiliation status affects access to financial support, and 33% and 58% of whom do not know if next generation researchers can participate in the organization of activities and the governance of the RG, respectively. A lack of communication, difficulty reaching next generation researchers, and a lack of access to information were pervasive concerns in both surveys (director and student).

1.2. Conduct regular awareness campaigns to foster interest and inform next generation researchers on the opportunities offered by RGs. ☆

Although RGs are an ideal environment for students to obtain support, network, participate in the organization of major events, and develop research governance skills, 68% of next generation researchers with no RG affiliation stated that they were unaware of the existence of RGs. It should be noted that 51% of unaffiliated next generation researchers identified at least one RG corresponding to their research theme and 92% of them would be interested in joining the group if they met the affiliation requirements. Of the affiliated next generation researchers, 42% discovered at least one new RG corresponding to their research interests on consulting the list provided with the survey. Thus, regular strategic communications could greatly contribute to raising awareness of RGs and, by extension, the FRQ. Since the FRQ communications department targets a different audience than the RGs, it could be effective in reaching out and informing unaffiliated next generation researchers.

1.3. Fund a "Research Group Student Forum" organized by the CIE. ☆

The objectives of the Research Group Student Forum would be to develop clear communication channels between the CIE and next generation researchers in RGs, and to develop unique networking opportunities, new inter-RG initiatives by and for next generation researchers, and opportunities for mutual learning (best practice guide). The Forum could also represent an opportunity for RG-affiliated next generation researchers to develop cross-cutting skills. Moreover, the Forum would respond to some of the needs expressed in the student survey by helping improve organization and offering more opportunities for sharing and learning through rich exchanges between participating members. The outcomes of discussions and focus groups held by the Forum could be used to produce documentation

and useful tools for all next generation researchers in each RG. The Forum could be made up of next generation researchers from RGs and members of the CIE.

2. Allow RGs to broaden their affiliation criteria for next generation researchers conducting research related to their research themes.

2.1. Allow research groups to authorize affiliation for student and postdoctoral researchers who are supervised by a regular, associate or collaborating member. ★

This sub-action is aimed at allowing more next generation researchers doing research related to an RG's theme to become affiliated with the RG. Next generation researchers would also be able to approach their supervisor about joining an RG, opening the door to affiliation. The affiliation of students supervised by a regular member or an associate or collaborating member is a practice that is currently in place in 95% and 41% of RGs, respectively. More flexible affiliation would allow for more inclusive access to the different forms of support and opportunities offered by RGs, in particular for postdoctoral fellows who may conduct research that diverges from their supervisor's main research theme.

2.2. Allow research groups to authorize affiliation for all types of students and postdoctoral researchers, including college students. ★

This sub-action is aimed at promoting the participation of next generation researchers of all levels in research groups that align with their research interests, particularly college and undergraduate students who have less exposure to the research ecosystem. Affiliation with an RG would give them access to opportunities and help them develop their research interests at an earlier stage of their academic career.

3. Encourage the involvement of next generation researchers in the activities and governance structures of RGs.

3.1. Include student involvement and participation in governance in the evaluation criteria for FRQ training award applications[23]. ★

When asked about the issues that limit their involvement, 66% of next generation researchers put lack of time at the top of the list, despite an interest in getting involved. Greater recognition of student involvement in the evaluation of scholarship applications could encourage next generation researchers to be more involved. Both directors and next generation researchers would like to see greater next generation researcher involvement within the RG, mainly in the organization of conferences or science days, knowledge mobilization activities and training.

[23] This recommendation applies to involvement and participation in governance in general, not only within the RG, in the context of a master's, doctoral or postdoctoral training award.

3.2. Encourage next generation researchers to participate in the governance of the research groups. ★

The development of governance skills is achieved in part through involvement and training in decision-making and the functioning of governing bodies. Moreover, when asked which statement best describes the significance of next generation researcher participation in the governance of the RG, most student survey respondents selected “indispensable”, “recommended” or “important”. In addition to the training such involvement provides for next generation researchers, we believe it is crucial to encourage next generation researcher participation in governance. This ensures that all members of the RG are consulted when decisions are made.

3.3. Establish an award recognizing next generation researcher involvement and governance experiences. ☆

The director survey indicated that next generation researchers, in general, are actively involved in the organization of activities and the governance of the RG. These opportunities allow next generation researchers to experience the many facets of the research ecosystem and to hone their leadership and communication skills. In addition, as underlined by one director survey respondent, student participation in governance facilitates the intergenerational transfer of research culture. The creation of an award recognizing involvement and governance experience could motivate next generation researchers to become more actively involved. We recommend that the award consider all involvement and governance experiences, not only those acquired within the RG.

4. Improve RG grant programs to better integrate next generation researchers in the RG ecosystem.

4.1. Reassess the evaluation criteria and sub-criteria pertaining to next generation researchers in all FRQ RG grant programs with the intention of achieving their full potential. ★

In our analysis of programs as of March 2020, the evaluation criteria covered training, student recruitment and integration mechanisms, and exchange opportunities. All RG programs except RT have a “research training” criterion specifically for students. For RT, student integration and opportunities for exchange between students and other research actors are evaluated by means of sub-criteria of a broader criterion. The evaluation criteria or sub-criteria could aim to assess the performance of RGs in developing the potential of next generation researchers within their RG. It is suggested that the sub-criteria be associated with the four dimensions targeted by this project, for example: (a) accessible and transparent information on the status or statuses of next generation researchers, (b) support adapted to the needs of next generation researchers, (c) involvement opportunities for next generation researchers, and (d) governance training for next generation researchers in (e.g., seats on committees).

4.2. Authorize and specify that funding for an RG-affiliated student committee is an eligible expense. ☆

The majority of RGs currently have student committees, some of which receive financial support from their RG for operations and student needs. Adding information about this type of expense would remove any doubt about the eligibility for such financial support.

5.2 Courses of action for research groups

1. Increase the involvement of next generation researchers in the structure of the RG.

1.1. Encourage and support initiatives coming directly from next generation researchers, and offer opportunities to be involved within the RG. ★

A lack of time on the part of RG staff is an issue that was raised often during the qualitative analysis of our data, while one third of next generation researchers indicated that they would like to be more involved in the planning and organization of training and networking activities. Moreover, next generation researcher involvement in the organization of the RG's activities could contribute to the development of cross-cutting skills, particularly in management and organization. It is therefore suggested that while RGs should offer opportunities for involvement, it is even more important that they encourage and support initiatives coming from next generation researchers. Indeed, one respondent of the director survey underlined that there has been greater student involvement since the RGs gave next generation researchers the freedom to self-organize while providing them with financial and logistical support. In addition, the creation and implementation of new projects by next generation researchers has the potential to generate a greater sense of belonging and autonomy among the students affiliated with the RG.

1.2. Involve next generation researchers in the governance of the RG. ★

To train engaged next generation of researchers, we believe it is important that they be involved in the governance of their RGs. Training in decision-making and the functioning of the RG's governance bodies would empower next generation researchers to propose strategies and directions that address their own issues. It would also enable them to express their needs while increasing their sense of belonging. We also suggest that the seats reserved for new student members be given the same voting rights as any other member, a practice already in place in 76% of RGs. Furthermore, while the involvement and contributions of next generation researchers are part of the strategic plan of 93% of RGs, only 64% of them include next generation researchers in discussions about the plan. The survey shows, however, that next generation researchers exhibit a strong motivation to be more involved and to be consulted on matters that concern them. We therefore also recommend involving students in the development of the RG's strategic plan.

1.3. Systematically consult next generation researchers when discussing issues relating to them. ★

The next generation researchers of each RG have their own characteristics and needs. Therefore, we recommend consulting them regularly to implement adequate forms of support that evolve with their needs. A significant proportion of next generation researchers reported that they were consulted about the most appropriate training (63%), networking activities (44%), services (41%), and types of financial support (28%), while the director survey shows that the majority of RGs consult students for each form of support (74%, 68%, 81% and 50% of RGs, respectively). Two main conclusions emerge from these results: 1) the consultation methods used by management do not appear to be effective in reaching next generation researchers, and 2) consultation on financial support is the least common compared to the other forms of support. Systematic rather than *ad hoc* consultations could help to keep students informed of the best opportunities to express their needs.

2. Improve communication between next generation researchers and RGs.

2.1. Create, share and regularly update a "Next generation researchers Guide" produced in collaboration with next generation researchers. ★

As mentioned above, next generation researchers are widely unaware of the benefits and forms of support offered by RGs, or of the relationship between these benefits and affiliation status. A guide for each RG, created according to the FRQ guidelines (Course of action 1.1 for the FRQ), would answer several questions raised by affiliated next generation researchers, 65% of whom do not know if affiliation status affects access to financial support, and 33% and 58% of whom do not know if next generation researchers can participate in the organization of activities and the governance of the RG, respectively. A lack of communication, difficulty reaching next generation researchers, and a lack of access to information were pervasive concerns in both surveys (director and student). The next generation researcher guide could help inform next generation researchers about the benefits of affiliation (training, networking activities, services, financial support, etc.) and opportunities for involvement (organization of conferences, governance, etc.). In addition, the guide could explain affiliation statuses, eligibility requirements and access to financial support. This guide could be given to all new student member at the time of their affiliation.

2.2. Develop efficient means to generate up-to-date data on affiliated next generation researchers. ☆

We believe it is important for RGs to have extensive and up-to-date information on their members to plan their activities, their budget and the forms of support they offer, and to effectively promote the impact of their activities and members. Considering that, according to our director survey, an average of 23.3% of an RG's total funding (from the FRQ and other revenues) is allocated to next generation researchers in various forms (across all programs), access to up-to-date data on student members would allow RGs to optimize their outreach and budget planning. However, a large majority of director survey respondents were concerned about the time-consuming nature of collecting this data. Due to the high turnover rate, the data that is collected is generally unrepresentative, according to several director survey respondents. In addition, 90% of RGs entrust the management of this data to staff members, who in turn rely mostly on data provided by research members. One possible solution would be the creation of a web platform, which would allow for the collection of self-reported next generation researcher data and would potentially facilitate the management of affiliations and data, while also promoting the autonomy of next generation researchers.

3. Broaden the affiliation criteria and improve access to funding for next generation researchers conducting research related to the research themes of the RG.

3.1. Authorize affiliation for student and postdoctoral researchers who are supervised by a regular, associate or collaborating member. ★

Allowing affiliation for students supervised by an associate or collaborating member, in addition to regular members, would make access to RGs more inclusive for students. This is particularly relevant for some postdoctoral fellows who conduct research that diverges from their supervisor's main research theme. It would also allow next generation researchers working on the research

theme of an RG to approach their supervisor about joining the RG as a steppingstone to obtaining affiliation. The affiliation of students supervised by a regular member or an associate or collaborating member is a practice that is currently in place in 95% and 41% of RGs, respectively. This sub-action could provide RGs with more diverse opportunities for collaboration by accepting next generation researchers and supervisors from different sectors, as long as their research is related to the themes of the RG.

3.2. Authorize affiliation for all types of student and postdoctoral researchers, including college students. ★

The student and direction surveys emphasize the very low proportion of college and undergraduate students within RGs. We believe that promoting the participation of next generation researchers at all levels in research groups that align with their research interests would provide an excellent opportunity to increase exposure to the research ecosystem. The implementation of this sub-action would provide them with access to opportunities and help them develop their research interests at an earlier stage of their academic career.

3.3. Periodically reassess and update the eligibility criteria for next generation researcher funding and systematically provide access to competition evaluation criteria. ☆

Nearly a quarter of student survey respondents indicated that they did not have access to financial support because of their status (e.g., part-time, postdoctoral fellow, supervisor who is not a regular member) even though their research theme is in line with that of the RG. A periodic reassessment of RG rules for awarding funding would ensure that the criteria remain relevant for students and the RG. It could be beneficial to ensure that funding for next generation researchers is updated and increased based on the current number of eligible student members if sub-action 2.2 is put in place. In addition, we recommend providing systematic access to competition evaluation criteria, so that next generation researchers are able to prepare a competitive application. It is also suggested that evaluation committee members' comments on applications be made available, whenever possible, so that the RG competitions are instructive for next generation researchers.

5.3 Course of action for student and postdoctoral researchers

1. Establish an organizational memory and become actively involved in the RG.

Considering the high turnover of next generation researchers, we believe that it would be useful and effective to share their knowledge and skills through the creation of permanent documents. Conserving expertise would make it possible to maintain a committed student membership whose activities are increasingly successful over time despite committee turnover. For example, documentation could include job descriptions, documents setting out procedures and instructions for carrying out tasks, and event reports (invoices, contacts, strengths and weaknesses, phases and timelines, etc.). Each position could also have an "apprentice" to facilitate transitions.

6. Conclusion

This report paints a picture of the situation of next generation researchers in RGs based on four key dimensions: status, support, involvement, and governance. When compared to our internal study carried out in 2015, the situation of next generation researchers within RGs is much more positive when it comes to their involvement in RG governance. However, the communication between next generation researchers and RGs still requires improvement. Next generation researchers have statutory seats on governance committees, with voting rights in the majority of RGs. Some courses of action have already been integrated in the new version of the FRQNT-RS program, which was approved by the FRQNT board of directors in December 2020. They were included following the redesign of the program and are part of a dynamic process to improve the program rules. We sincerely believe that implementing the proposed courses of action by the FRQ, RGs, and next generation researchers themselves would contribute to developing and enhancing the potential of next generation researchers within RGs funded by the FRQ.

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