

**Report on voting software from the Faculty Technology Committee (FTC),
a subcommittee of John Jay College Faculty Senate**

Drafted for the committee by co-chairs Ellen Sexton & Sven Dietrich, 3 August 2020.

The current public health situation, the need to practice social distancing, and the New York State wide “Pause” declared by Governor Cuomo mean that departmental and other college elections are no longer being held by paper ballot as has been our usual practice. There is no precedent at John Jay for holding college elections virtually, and there is no existing College policy or practice on virtual voting to guide us. We, the members of the Faculty Senate Technology Committee, have investigated and discussed, in person and virtually, the issues surrounding virtual voting, and we have concerns regarding:

1. Safeguarding the security of election results;
2. Protecting the privacy of voters;
3. Voters’ experience;
4. Mirroring online our shared governance practices.

Electronic/online voting is not an easy problem and Faculty should take time to consider the best long-term options to ensure the integrity of our College governance practices. We are concerned that a decision made in haste may not be the best practice for the long term.

In this report, for the convenience of our readers, we start with our recommendations. For those wishing to further explore the issues, we continue by identifying the types of voting that routinely take place at the college, outline desirable characteristics of voting software (security & usability), briefly review software solutions (Big Pulse, SimplyVoting – including its use at JJ, Helios, Adoodle, Qualtrics, SurveyMonkey), and recount events relevant to distance voting at the college. An appendix contains the Senate Executive Committee Recommendations for Elections and Faculty Personnel Voting for Spring 2020, and an account from the English Department Chair Jay Gates of the department’s experience using SimplyVoting software

Our recommendations:

No single solution should be mandated; each voting body should be free to choose the solution they believe most appropriate for their circumstances. Faculty and departments should choose the technology that fits their department election needs, comfort level, usability and security needs, taking especial care for elections that may be controversial or contentious. A short list of reviewed software solutions is included in this document.

The College by-laws charge a specific body with responsibility for conducting elections; this is the Elections Committee, a sub-committee of the College Council. Other than making a recommendation in March 2020 that the College adopt virtual voting, they were not involved

with any aspect of decision making or management of late-spring 2020 college elections. Going forward, their involvement is vital.

The Faculty Senate has resolved to discuss distance voting at their September 2020 meeting; this discussion should be informed by faculty experiences during the past spring semester. We encourage them to consider software security and usability; how the software is administered, user experience, possible effects on voter participation rates and our usual faculty shared governance practices. We stress the importance of considering where the trust in the election resides, i.e. is it retained within the voting body or outsourced to external consultants charged with overseeing internal matters.

Types of voting carried out by College governance bodies:

- **Secret ballot voting**
Secret ballot voting is conducted by the college Faculty Personnel Committee (FPC), the Senate, and departmental personnel committees. This includes voting yes/no, identifying a majority from a set of candidates with write-ins, a ranked list, multiple rounds of tie-breaking, and more. Our pre-pandemic procedures were extremely secure and had a high level of personal anonymity; the Elections Committee mailed out ballots, voters returned them in unmarked envelopes, and counting took place in the presence of multiple members of the Election Committee. There was little likelihood of voter anonymity being breached, or of election tampering.
- **Public voting**
We vote publically on motions at the College Council with a show of hands by those physically present in Room 9.64 of Haaren Hall, to indicate 'Yeah', 'Nay', or 'Abstain.' Clicking the 'Raise hand' button in the Zoom participant list, for example, could be considered as equivalent, and would require zero set up time.

Desirable characteristics of software solutions: Security & usability issues

Advantages of virtual voting:

- Enables Faculty to engage in shared governance activities while remaining physically distant from one another.
- Ease of voting may arguably increase participation.
- Software could improve our logistical capability of introducing more representative and arguably fairer election methodologies than we current use – e.g. we could use

proportional voting with single transferable votes rather than first-past-the-post (note: election procedural changes remain subject to revision of the college by-laws).

Caveats & considerations: Security, anonymity, trust, & administrative workload.

It is important to understand the requirements and expectations for voting within each governing body; College Council, Faculty Senate, academic departments, Faculty Personnel Committee (FPC), and other committees. What are they, and who should run the elections? We need to consider what it means to vote, and whom to trust with administering the election. How does software verify voter eligibility or prevent double voting? Is there a way for the voter to verify that their ballot was properly counted without it being attributed to them (to prevent voter coercion)? Privacy, confidentiality, and trust all need to be considered. Consideration of where the trust resides in each setup is key.

There is more involved than taking out paper ballots in a meeting of people physically present, so some preparation work is involved with virtual voting. A pre-election setup to identify eligible voters is needed in some cases (e.g. Helios and SimplyVoting).

The basic principles are:

- Security and reliability.
- Anonymity. Objective confidentiality of the voter's vote – not trusted intermediaries such as the Department of Information Technology (DoIT).
- Local management. Ordinarily, voting is managed by the voting body, e.g. the secretary of the College Council, the chair of the Faculty Personnel Committee, the review committee, the department, or the Senate, and not by a central authority or outsourced thereto.
- Role-based group association (or in security terms, Role-Based Access Control¹ (RBAC)). This is the capacity to manage a large voter list for multiple elections by different groups. You want to associate labels (authorizations, or group membership) to a name. It would be inefficient and unreliable to treat each election as a new instance. For example, a voter database for a typical faculty member should associate that member with full-time faculty, the College Council, the Faculty Personnel Committee (FPC), their FPC review committee, their academic department and program, and the Senate.
- Multiple administrators/trustees. Election administrators (or trustees in Helios) in an online voting system can, by design, “unblind” the private votes if all or a minimal subset collude/cooperate. So if the election is setup (unbeknownst to the voters) with one trustee only, they can “unblind” the votes. A good setup would have three to four

¹ RBAC: a form of access control that is already in use by DoIT at John Jay and CUNY, where a user can take on many roles, e.g. as a faculty member, department chair, program director, advisor, student, student worker, with associated access rights to employee records, student records, grant details, or department budgets.

trustees of various affiliations (Helios can be a trustee, and is in most elections) so that only collusion of all trustees can resolve any disputes in a particular voting situation.

- Ease of use.

Just as we can choose from Zoom, WebEx, and Blackboard Collaborate Ultra for our online meetings and teaching, there should also be a choice of tools for voting. It should be up to each department / body to choose a system that would be agreeable to them.

Reviews of selected voting software solutions:

Big Pulse: www.bigpulsevoting.com

Strengths:

- High usability and ADA compliant.
- A very solid voting platform.
- Provides secrecy and anonymity, and protects voters from interference. No link is kept to connect the voter and the ballot, that is as it should be for a secret ballot; not even the company can undo the confidentiality (unlike with SimplyVoting).
- CUNY Hunter College uses it (the vendor confirmed that they have a similar setup to one appropriate for John Jay) as does California State University at Northridge, our Provost's previous employer.
- Can be used in large (college-wide) or small (department) settings, and is priced accordingly.
- Authentication tied to our DoIT JJC credentials is possible (SAML, Security Assertion Markup Language). Authentication via remote link technology is also an option.

Detailed technical documentation is available on request from the Faculty Technology Committee Chairs, and /or by request from the *Big Pulse* site at <https://www.bigpulsevoting.com/about/security/>

Weakness:

- Commercial product, requires payment.

SimplyVoting: www.simplyvoting.com. (SV).

Strengths:

- It is easy to use, and ADA compliant. The vendor's election manager controls the set-up.
- A product of a Canadian company, it is in widespread use there, for everything but federal elections.

Weaknesses:

- There is a possibility of interference with the election, and overruling the secrecy of votes in SV (e.g. having a single election coordinator controlling the election vs shared coordination that requires collusion of the coordinators).
- The confidentiality of the voter is at risk as information about votes cast may be purchased from the company as an add-on “feature.”
- Commercial, requires payment.

Caveat:

It is a mature, commercial voting system, but it is not transparent in its security foundations. There is a difference between operational principles (tuning parameters/settings that can fix, say, broken default settings), and fundamental principles (design decisions that can't be changed easily, and that may compromise the security/privacy). The Simply Voting "users" manual does not give the technical details of the underpinnings of their voting process. Their "specifications" are merely *operational* technical details of the website, authentication mechanisms, but, again, do not describe details of the *fundamental* security principles/guarantees of voting, the ballots, tallying, etc. Neither of the above address underlying election security. For example, the fact that someone can change an established election ("*contact support for making edits*") casts a shadow on their security. That means someone can override settings, which is highly questionable.

Use of SimplyVoting at John Jay in Spring 2020:

Departmental elections and Faculty Senate elections were held remotely at the end of the semester using SimplyVoting. The Faculty Senate ballots were emailed to Faculty, with a vote required within two days. The FTC considers two days to be too short a time frame.

Text of email from Faculty Senate to the faculty re voting in election (29 April 2020):

Please vote for 13 (or fewer) of the 16 candidates. The deadline for casting your ballot is 12 noon on Friday, May 1.

SimplyVoting is a secret ballot voting platform purchased by the College at the recommendation of the Faculty Senate Executive Committee and Faculty Senate Technology Committee. SimplyVoting is secure, anonymous, and confidential. No one – including the DoIT staff – will know who voted or how they voted. You can vote with complete confidence that your ballot is truly secret and secure. Please visit <https://johnjay.simplyvoting.com/> and login using your John Jay email and password.

We have become aware of issues with both usability and security of SimplyVoting. We had originally thought SimplyVoting sufficiently secure. One issue was acknowledged by

the Chair of the Faculty Senate, Ned Benton: *“It is possible for JJCCJ to order, as a special add-on feature, the option for the system to produce a report of who voted for who.”* (email from Professor Benton, *Faculty Inquiries about the At-Large Election*, 30 April 2020). That the college would *“of course”* choose not to purchase this option is insufficient assurance.

User experiences with SimplyVoting were unsatisfactory during at least one departmental election (see email in the appendix from the Chair of the English Department) and at the college FPC meeting in May (anonymous anecdote). The English department used Simply Voting with over fifty faculty members for slate votes in uncontested elections: *“Having just finished my departmental elections, I would like to declare the Simply Voting system a complete failure”* (Chair’s email). At least some departments relied on assistance from DoIT to run their SV elections; departments do not usually call in external people to conduct their own elections. During pandemic times, we should be using distance technology to mirror what we normally do, and not introduce new middlemen that gain insight into our voting decisions and activities.

Helios: www.heliosvoting.org

Strengths:

- Free to use.
- Can be used as-is on the vendor site
- Used for university elections at many sites worldwide over the years.
- Setup is straightforward. You can copy existing elections to repeat or modify them, or even archive them. You add lists of eligible voters that would need to authenticate via Google or Facebook (via the OAuth API, even with 2-factor authentication if need be). There’s a no frills quick setup, or, you can download the source code and install it on a dedicated server for further customization.
- During use, the voter sees reassuring messages about the cryptographic guarantees of the votes.
- Trust can be retained within the electing body, if someone there has the skills and time to set it up.

Weaknesses:

- Using it with JJ credentials for authentication would require staff time & skills.
- Setting it up on a JJ server for full operability would require staff time and skills.

Caveats:

Authentication:

Helios uses an authentication system called OAuth, "federated identity management" (<https://en.wikipedia.org/wiki/OAuth>), which is common practice online. You authenticate with Google or Facebook (FB) to setup a test or real election / vote, as a participant or organizer. Helios does not have a "relationship" with Google or Facebook, but merely accepts the credentials presented by those authentication systems. That's like saying, "Ok, I see your driver's license from Ohio and accept it as an identity document, thanks. I see your name is in my list of eligible/registered voters." Or accepting a <fill-in-your-favorite-country> passport from that user/faculty member. Helios assesses if you are an eligible voter using FB or Google OAuth API information, based on a list uploaded per election. It could be modified to recognize John Jay emails, if JJC DoIT offers an OAuth API. If JJ DoIT does not, the Helios code could be modified. Other authentication methods are available, but that requires some tech setup at a specialty site.

Limitations of demonstration model:

Helios Voting in its online "demo" lacks certain features, even though the full release (free to download) has the hooks that would make it more compatible and compliant. This is very transparent as it shows the steps in simple pages. The full release would have to be installed on a dedicated server, and the somewhat tedious set-up managed by a competent election manager, which raises the issue of trust. Trust is delegated to the person designated to manage the set up. The fix, and it's not a quick one, would be to train someone in each department, committee, etc. in holding online elections. That would keep the trust local, and not centralized to DoIT. Setup may be a bit more challenging than some of the other setups, but the trust is better identified than in other settings.

Additional note: The Helios advisors include cyberlaw activist & IP expert Lawrence Lessig.

Adoodle:

Strengths:

- Appropriate for surveys and polling (anonymous votes).
- It could be administered by the leader of the voting body, and no technical support from DoIT would be needed.
- It has a decent security analysis.
- Choose to have the election results tallied at the end, or observed as voting occurs.

Weaknesses:

- The election administrator may be able to identify how someone voted, using knowledge of when a vote was cast and which voter is no longer eligible to vote, because they have already cast a vote.

- Commercial; requires payment.

Notes on Adoodle process and security:

- A description of the election and a list of all the eligible voters' emails is emailed to all voters and observers. Voters also receive a ballot. The observer can follow the election "live," which is nice, if the election is setup properly, but that is also a weakness.
- The ballot is an identifier for the election (random string) and a unique identifier for the voter. It is unclear how those are generated, but there may be some keyed hashing involved (<https://en.wikipedia.org/wiki/HMAC>).
- All someone needs to vote are those two strings. One could click on the link supplied in the email (which triggers an "attention" switch on the site, meaning the voter has reacted to the email). A similar reaction may be triggered by entering those two strings on the adoodle.org site and not voting all the way through.
- However, someone could take the strings and check whether a particular voter has already voted. Depending on how the election was setup, that could give some hints as to who voted what. Only hints, not knowledge. In the worst scenario though, when a malicious observer closely follows (e.g. reading unencrypted email traffic or tapping into voters' email inboxes) an immediately (untimed) tallied vote (one of the options in adoodle.org), knowing who has voted or not could indicate a particular vote. An extreme case, but we are dealing with contentious situations here: the ADoodle author warns against this, meaning the author is quite aware of non-friendly scenarios.
- Not sure how realistic that is, but someone issuing a subpoena is conceivable, even though the author claims everything gets wiped after disassociating the voter identification (read: email address) from the ballot.
- Voters are not authenticated directly, as they would be with Helios or SV.
- Two types of elections can be setup: 1) a timed election, where votes are only tallied at the end of the time period, and 2) an untimed election, where votes are tallied immediately (on the fly). The ADoodle author warns against some scenarios here involving type 2.
- No one can override the election, unless you bribe/coerce the ADoodle author.

Qualtrics:

Useful for polling and surveys; may not offer the securities of a good, solid voting system. Used at Baruch College: *"We create and use Qualtrics voting surveys that are available only to the P&B members and are anonymous. We have been doing this even before, where we were meeting face to face."*

SurveyMonkey:

Useful for polling and surveys. Gives no apparent guarantee of confidentiality of the votes. We do not know if the tally is performed at the end (stronger security) or continuously (weak, prone to revealing who voted what).

Background/Timeline of events relevant to distance voting at the college:

In 2019, the Faculty Senate asked the Faculty Technology Committee (FTC) to consider software solutions for holding virtual elections. The committee discussed the complexity of the issue in fall 2019, but had not issued any recommendations. During the pandemic, addressing the question became urgent. The FTC considered and discussed software options via email and in person, especially those identified by the Senate as possible solutions.

On 24th March, 2019, the FTC met via Zoom. A recommendation with caveats was drafted and distributed after the meeting; there were no dissenters, and ten members emailed in support. It was emailed to the Senate Chairs 3/27/2020, as the email below:

Dear Karen & Ned:

The faculty technology subcommittee have been discussing how to meet the need of the College for remote elections during this emergency period. We have been informed by our in-person discussions of election software options during our scheduled meetings early this academic year, email discussions, and a Zoom meeting this week. Please see below the recommendation of our subcommittee.

We recommend the following, if used for decisions at appropriate levels of sensitivity :

- A simple show of hands in Zoom (or other virtual meeting software) only if security/privacy is not an issue.*
- Helios Voting. (free). For personnel and other highly sensitive issues.*
- SimplyVoting (if funds are found to pay for it). For personnel and other highly sensitive issues.*

Both Helios Voting and SimplyVoting require a setup to authenticate the votes to check voter eligibility and to avoid problems such as double voting. Both systems have been used in large elections that require confidentiality. All election organizers should reconsider where the trust resides (or should reside) in their voting procedures and who they would want to delegate their trust to.

We do not recommend SurveyMonkey as there is no apparent guarantee of confidentiality of the votes.

We do not recommend the college's student government voting system at this time, as we have no information about it, so cannot assess it for security.

Sincerely,

Ellen Sexton & Sven Dietrich, co-chairs.

April 23rd, 2020. The Faculty Senate passed a resolution amending the college bylaws to permit online voting. The resolution included a stipulation that the issue be revisited by the senate in September 2020, and a recommendation that departments use SimplyVoting for departmental elections during the remainder of the 2020 academic year.

After President Mason received the Senate's Resolution on the universal use of SimplyVoting and on voting rules, she brought the issue to the Faculty Personnel Committee (FPC); as she explained to the FPC, she did not think the Executive Committee of the College Council (ECCC) was the appropriate body to make this decision.

On May 1st, The Faculty Personnel Committee (FPC) met and discussed virtual voting during the public portion of the meeting. After a robust discussion, consensus was reached: all faculty elections in spring semester 2020 would use SimplyVoting.

May 2020. Faculty senate members for the 2021 academic year were elected using SimplyVoting. Academic departments held their elections via SimplyVoting.

September 2020. New faculty senate to revisit virtual voting at the college.

APPENDIX

Item one. Email from Professor Ned Benton, Chair of Faculty Senate, to President Mason, March 26, 2020;

From: Ned Benton

Sent: Thursday, March 26, 2020 1:16 PM

To: Anna Austenfeld; Karen Kaplowitz; Yi Li; Karol Mason; Francis X. Sheehan; Schevaletta Alford; Andrea Balis; Brian Cortijo; Sven Dietrich; Joel Freiser; Ellen Hartigan; Musarrat Lamia; Fidel Osorio; Steven Titan; Janet Winter; Anna Papageorge; Alena Ryjov; Tony Balkissoon; Jill Maxwell; Ariana Kazansky

Subject: New Business Information Item for Executive Committee President Mason:

I request that the following Senate Executive Committee Recommendations concerning elections and faculty personnel voting be added to the College Council Executive Committee Agenda as an information-only item.

Senate Executive Committee Recommendations Elections and Faculty Personnel Voting for Spring 2020

1. Allow a distance version of FPC voting this spring for faculty first reappointments voting. The vote will still be done by secret ballot, using any of these four technologies: Helios, SimplyVoting, SurveyMonkey, or the system developed by DoIT for Student Government elections. The procedure for administration of the election process using such a selected system shall be shared with the Senate and the Senate Technology Committee.
2. For the Senate At-Large, Department and Graduate Program elections, the College Council Executive Committee should authorize one of the above technologies only for this spring, with a review over the summer or next fall as to how this worked, followed by a final decision by the College Council for subsequent elections.
3. In principle, the use of a digital voting system must eventually be approved by the College Council and should meet the following requirements:
 - a. Appropriate revisions in the College Charter and College Council Bylaws to permit video or digital participation in meetings in compliance with applicable laws and regulations, and to permit electronic voting in specified elections and personnel actions;
 - b. Satisfactory security and reliability;
 - c. Objective confidentiality of the member's vote and assurance of the voter's identity; and
 - d. A reliable and valid database of voters and voter contact information associated with the governance bodies and votes/elections for which the system is to be used.

Explanation

The Senate Executive Committee was asked by the Provost about methods of voting and the answer is pasted above.

It includes the two systems recommended for consideration by the Senate Technology Committee, as well as two other options under consideration by the administration.

It sets up a three-stage process for making the decisions.

Item two. Email from Chair Jay Gates, re Simply Voting experience in the English Department, 15 May 2020.

From: Jay Gates <jgates@jjay.cuny.edu>

Date: Fri, May 15, 2020 at 5:53 PM

Subject: Simply Voting Fallout

To: ENGDEPTANNOUNCEMENTS@listserver.jjay.cuny.edu

Dear Full-Time and Part-Time Colleagues,

To those of you who attended the department meeting this afternoon, I would like to apologize for the abomination that was Simply Voting. Below is the e-mail that I sent to the President, Provost, President of the Faculty Senate (where the plan to use this system originated), and the Chair of the Council of Chairs.

Best,

Jay Gates

Dear all,

Having just finished my departmental elections, I would like to declare the Simply Voting system a complete failure.

- 1) It is unnecessarily cumbersome. There are just too many people involved to make it work and there is too much delay in getting anything to happen in real time.
- 2) I sent my ballots and nominations four days before our elections. However, the person who was supposed to set us up was out sick, therefore, I was calling Joe this morning, a bit frantic about what to do. Joe was great and got back to me right away to get me set up. But really, that shouldn't be necessary. Joe runs DoIT and shouldn't have to deal with this kind of oversight.
- 3) Trying to manage a vote while running a meeting with 50+ people is just not reasonable. While the DoIT rep who was helping did his best, he kept texting me rather than the point

person I had set to communicate with him (he did not respond to her calls or e-mails but kept texting me while I was trying to run the meeting).

4) We sat there for a good 15 minutes while people tried to log in, failed, tried again, waited for an e-mail, clicked the link, still couldn't log in, got advice from 20 people on the Zoom meeting. It really was a waste of time. It was pretty much exactly what happened in FPC. I could have sent 500 individual e-mails (10 ballots x 50 faculty) via Survey Monkey and gotten anonymous results that were reasonably secure in the amount of time this election took. This is not an exaggeration. My elections usually take 20-30 minutes. This took an hour: longer than the rest of my meeting.

5) Four members of my department never were able to log in or vote. One of those may have accidentally been omitted because she is appointed in two departments. However, I have no idea why the other three had trouble. They tried logging in directly; they tried clicking the links they received in their e-mails; they tried repeatedly refreshing. But since the point person couldn't get through to the DoIT rep, there was nothing to do about getting them set up, and I really couldn't make the other 35 people wait while I called to figure out how to get them sorted out.

While, in the end, those four votes did not affect the election because the votes were overwhelming, four of my faculty were disenfranchised (I took viva voce votes after the fact, but that runs counter to our election by-laws). Moreover, one of my faculty reports that after repeatedly trying to log in, she has been locked out of her e-mail.

And I should stress, I run *very* tight meetings. I have nominations and slates set up in advance. *Every* vote was a slate vote. There were no contested elections. Heaven forbid there were. We cannot use this system again.

Best,
Jay

Jay Paul Gates
Department Chair and Associate Professor