In two previous papers the first author in joint work with Links and Bracken [J. Math. Phys. 33 (1992), no. 3, 1008-1022; MR1149222 (93g:81049)] and alone [J. Math. Phys. 33 (1992), no. 3, 1023-1031; MR1149223 (93g:81050)] has computed the matrix elements of the generators for the quantized universal enveloping algebra $U_q[gl(n, \mathbb{C})]$ and the reduced Wigner coefficients in the generic case. The approach is based on two characteristic matrices of which only one partitions into a convenient block form with respect to the embedding $U_q[gl(n-1, \mathbb{C})] \hookrightarrow U_q[gl(n, \mathbb{C})]$. In the paper under review the second characteristic matrix is replaced by an alternative one that yields the desired block structure. This new approach avoids using certain symmetry relations involving $q$-dimensions which vanish for quantum Lie superalgebras, and therefore generalizes to this case.